OCTOBER, 1961

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Modern Metals

Modern Metals

ALUMINUM ENTERS NEW ERA AS U.S. ADOPTS WORLD PRICE

ALUMINUM FIRMS QUIT TV TIME; TRIM SALES STAFFS

Ad Support for Customers No Longer Justified, Says Producer's Sales Chief

Copper, Zinc Smelters Pare Prices As Users Switch to Aluminum

PRODUCERS SWITCH TO BULK SELLING; IMPORTS SLOWED BY NEW LOW PRICES

★ ★ ★ ★ ★

METAL INDUSTRY HEADLINES—1962 STYLE

FOR AN ANALYSIS OF THE ALUMINUM PRICE CUTS, SEE PAGES 91 AND 92

ALUMINUM FIRMS' EARNING BETTER DESPITE PRICE CUT

Increased Shipments Offset Profit Gap; Markets Keep Growing, Say Producers

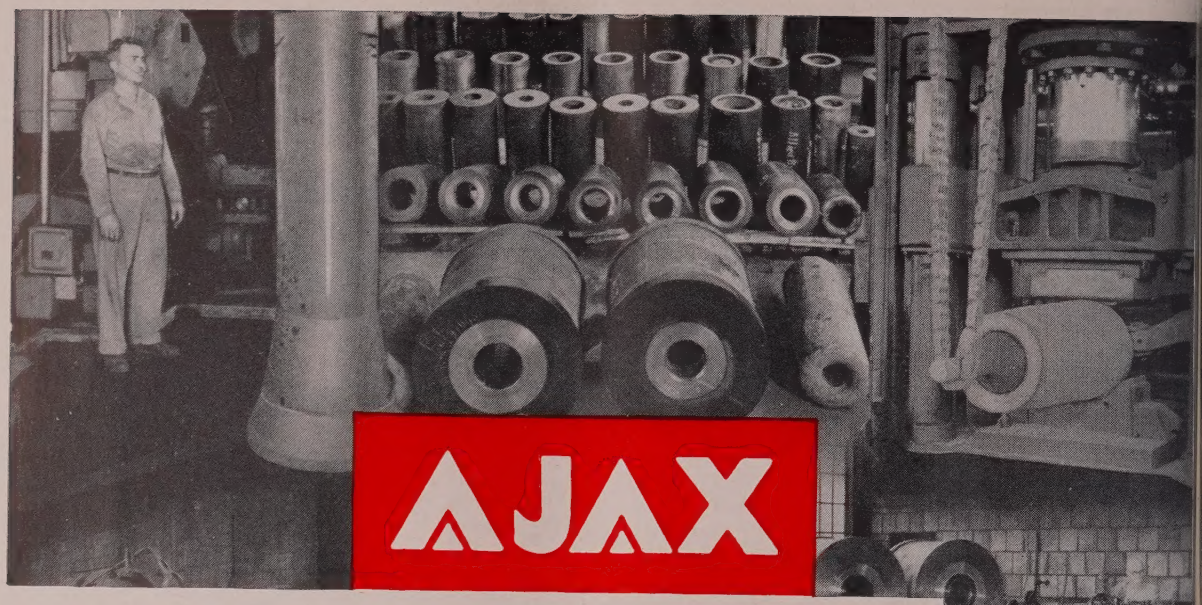
Magnesium Price Cut Seen As Bid to Hold Die Casting Markets

CANADIAN PRODUCER FAILS TO INCREASE U.S. SALES DESPITE PRICE REDUCTIONS

PROSPECTIVE ALUMINUM PRODUCERS SCAN PRICES, POSTPONE CONSTRUCTION

RUSSIANS BUYING U.S. ALUMINUM NEED MORE FOR BUILDING, RED NEWS AGENCY REPORTS

'Big Steel' Weighs Price Cut As Aluminum Invades Some Tonnage Markets



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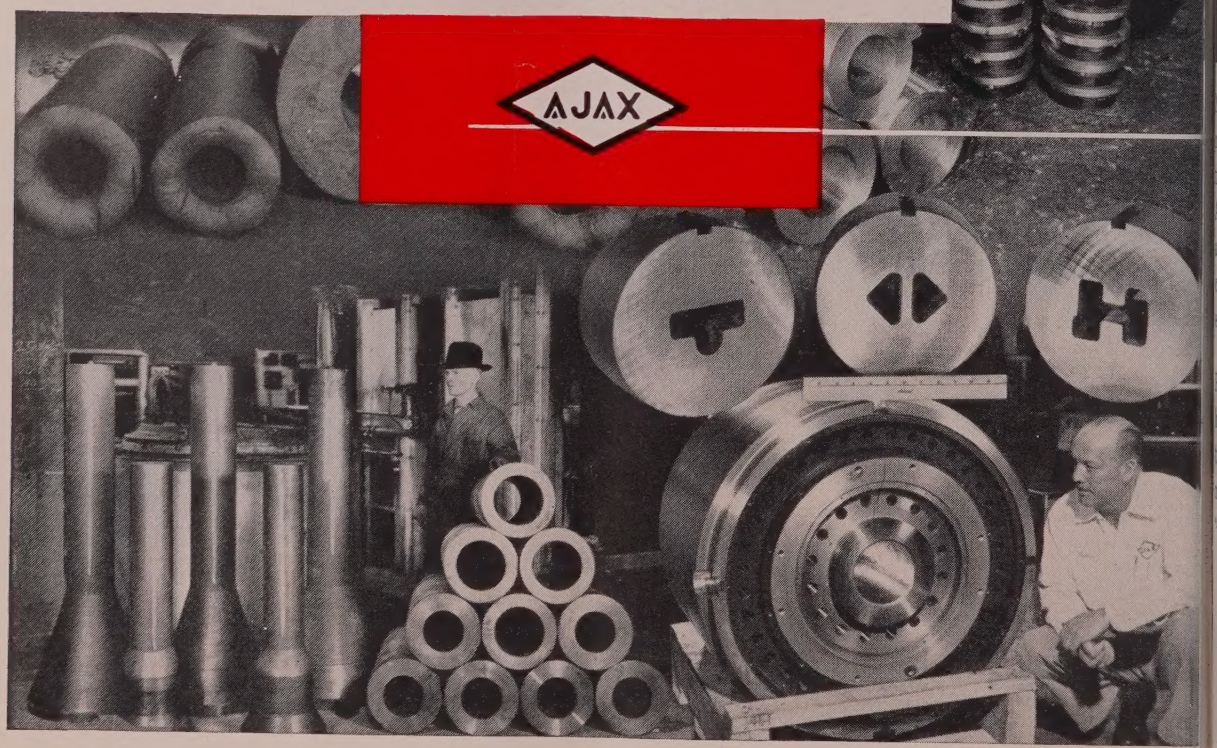

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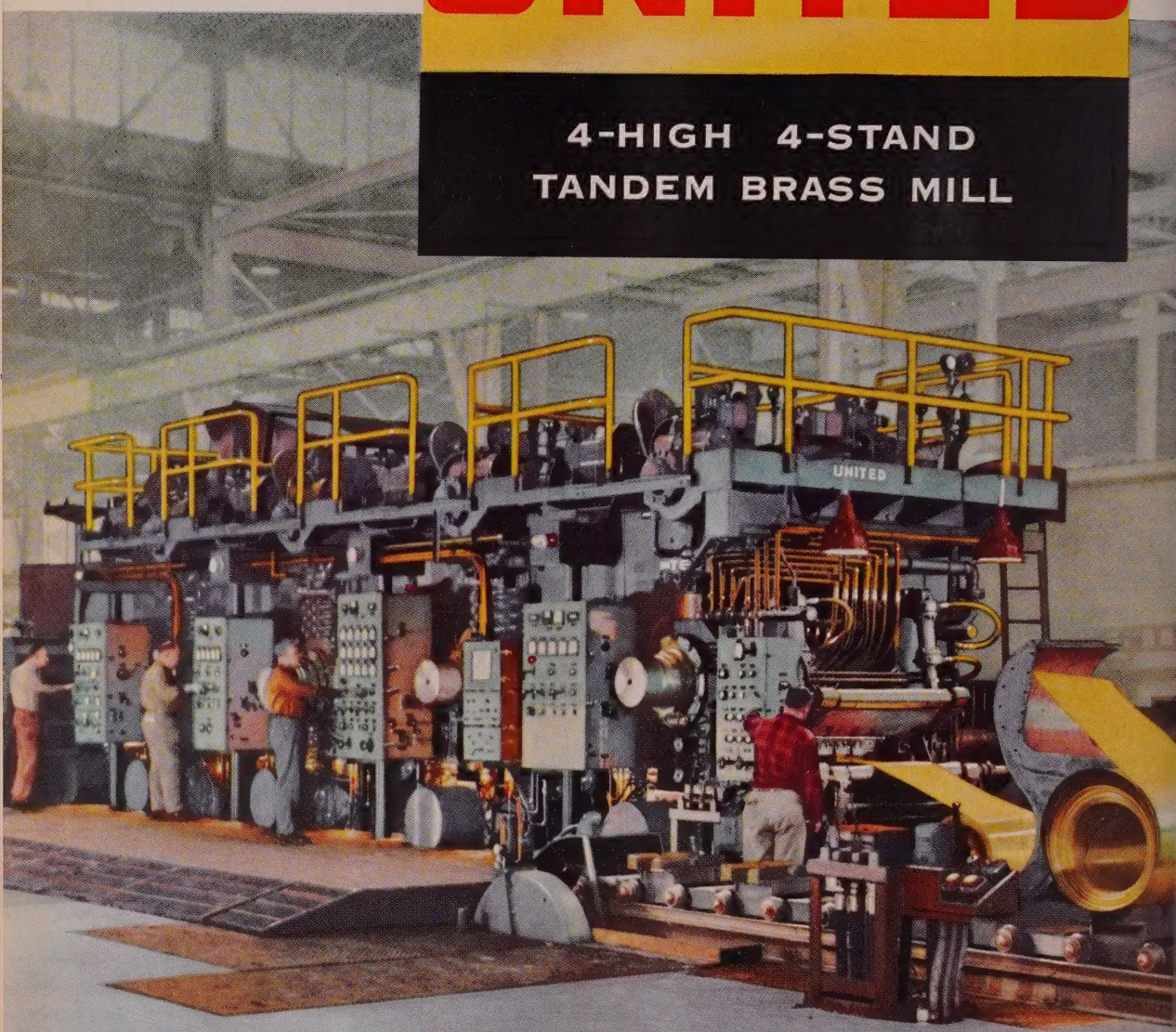

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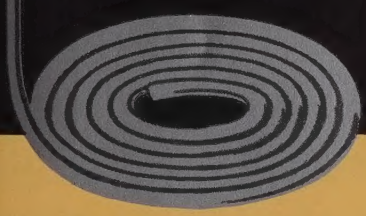

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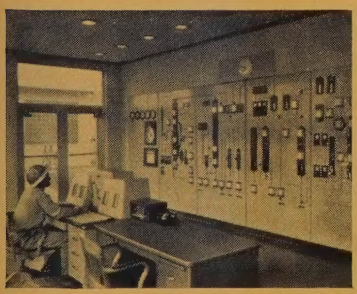
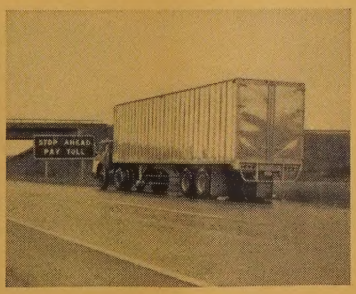
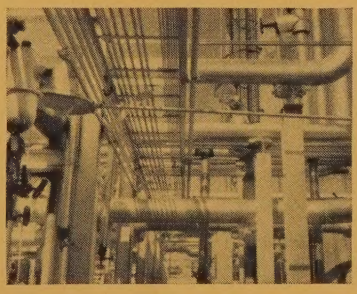
VERSATILE REYNOTUBE finds application in chemical and petroleum industries, truck-trailers, machinery and equipment, and in typical consumer items such as appliances, refrigerators, mobile homes, and automobiles.







Watch Reynolds exciting TV programs on NBC: the Dick Powell **Reynolds Aluminum Show** every other Tuesday; **Say When** weekdays; **All Star Golf**—in living color—every Saturday.

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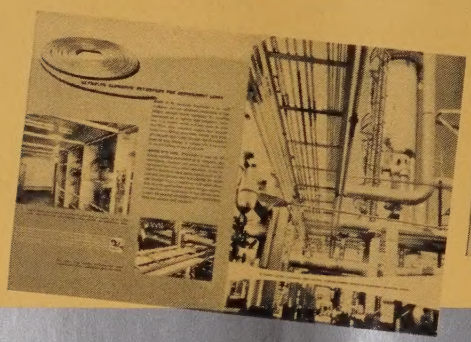

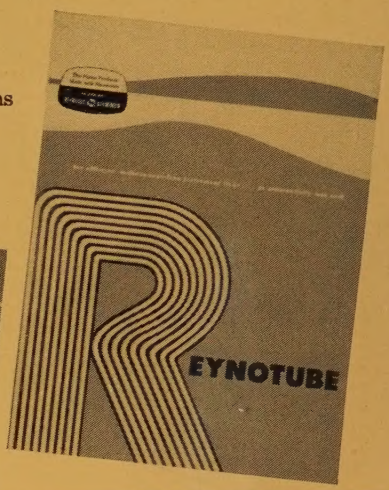

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			100°F	200°F	300°F	400°F	500°F
1/8	.025	.009	7,380	7,230	6,570	4,800	3,250
3/16	.028	.016	5,260	5,160	4,690	3,420	2,320
1/4	.032	.026	4,420	4,330	3,940	2,870	1,940
5/16	.035	.036	3,810	3,730	3,390	2,480	1,680
3/8	.049	.058	4,520	4,430	4,020	2,940	1,990
3/8	.035	.044	3,130	3,070	2,790	2,030	1,380
1/2	.049	.081	3,300	3,230	2,940	2,150	1,450
1/2	.035	.060	2,300	2,250	2,050	1,500	1,010
5/8	.049	.103	2,590	2,540	2,310	1,680	1,140
3/4	.058	.147	2,550	2,500	2,270	1,660	1,120

*Based on 5050-0 alloy

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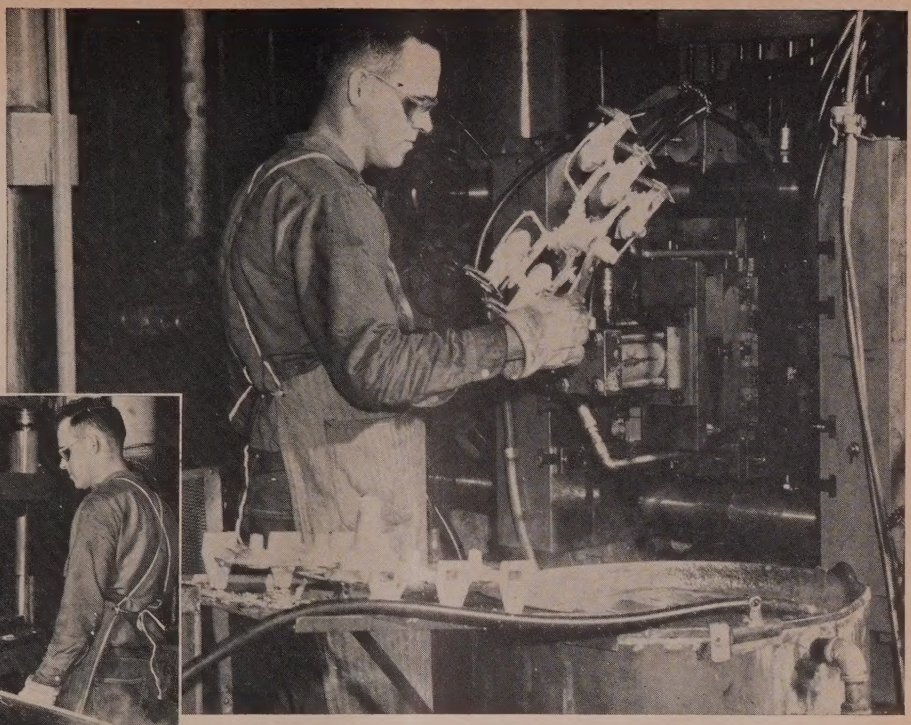

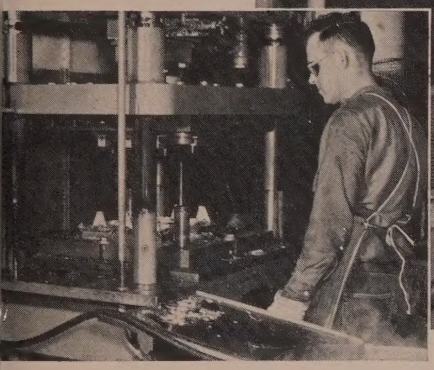

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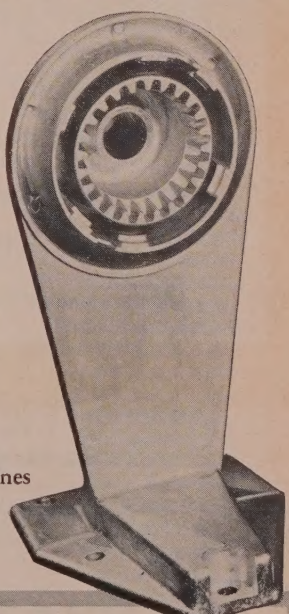

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Modern Metals
Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

THE COVER: You can lower those ed eyebrows now. Don't let those heads on our front cover scare you. They n't specific predictions, but are dramad speculation on possible developments ing from today's situation in the metalking industry. This month we devote full pages in "Looking Ahead" to the olications of the current aluminum price ure (it begins on page 91). And if a of the "headline" predictions actually ne to pass next year, we promise to pom: "We told you so!"

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Modern Metals

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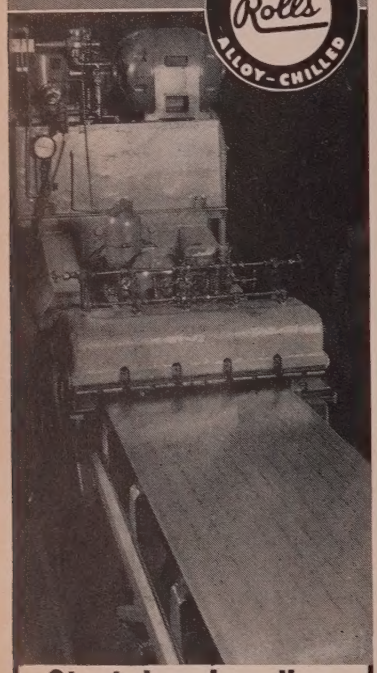
Hyde Park
Rolling Mill Equipment



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Letters

Reprints Wanted

Sirs:

We purchased some time ago from you a report entitled, "How to Clean and Finish Aluminum." We are interested in obtaining additional copies and would like to know whether or not they are available and, if so, the cost to us.

At the same time we would like to order some additional copies of your new brochure, "Welding Aluminum," and assume that these are still available.

"A"—W. Va.

Sirs:

Please advise the cost of the booklet, "Welding Aluminum," which is a series compiled from past articles in Modern Metals.

I would like to have about three copies for our welding department. This is the most comprehensive series on aluminum welding which I have ever read, and I am sure it would be a great help to our welding department.

"P"—Minn.

MM—We have an ample supply of the "Welding Aluminum" reprint. It's a whale of a bargain at a buck apiece (75 cents each if you order 25 copies or more). To order copies of this welding manual — or of the 48-page "Fastening Aluminum" book — use the order form on page 90.

As for the 36-page manual, "How to Clean and Finish Aluminum," we're sorry to report that we have sold all available copies, and have no plans to reprint it again. It was our second printing. Over the past two years, we've peddled some 20,000 copies — most of them at a dollar each.

Wants Information On Refractories

Sirs:

We have read with interest your article in the August issue of Modern Metals, "Special Refractories for Aluminum," and we would like to know the name and address of the supplier for the nitrided silicon carbide one piece channel liner for induction melting furnaces.

"D"—Colombia, S.A.

MM—The article—which has certainly stirred up interest—did not mention the name of the manufacturer of the liner you refer to. However, the report was submitted by the Refractories Division of the Carborundum Co., Perth Amboy, N. J. We have forwarded your inquiry to them.

Wants Anodizing Information

Sirs:

I am making a study of the most modern process of color anodizing of extruded aluminum. With this in mind I would like all the information that you can send pertaining to the type of set-up, process, material, and etc. needed in this undertaking.

Your cooperation in this matter will certainly be appreciated.

"J"—S. C.

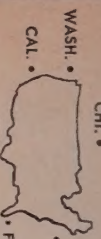
MM—We have sent you the names and addresses of suppliers of anodizing equipment and supplies. They can probably answer any questions you have about the process.

Bright Dip Report Pulls Strong Response

Sirs:

Please send us a copy of the article "How

ALUMINUM
SHEETS • PLATES • COILS • RODS
TUBINGS • EXTRUDED SHAPES
FORGINGS



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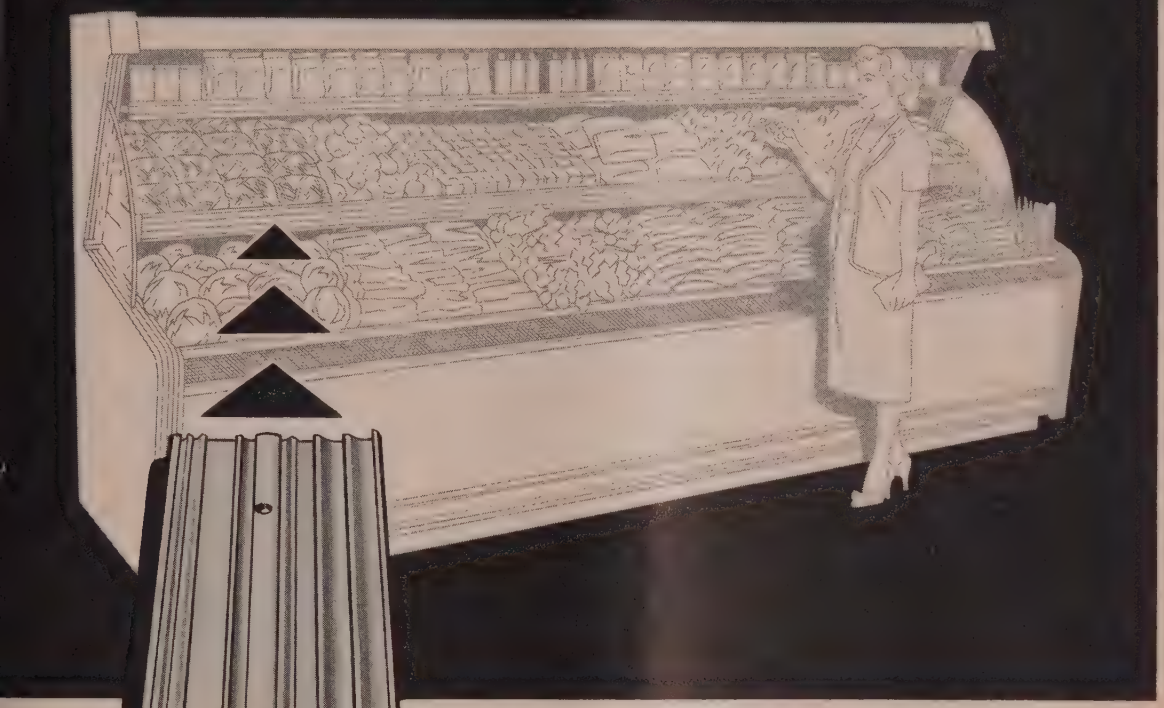

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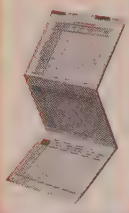

Here, in easy-to-read chart-form, is your guide to the selection of the right material and method for the removal of all commonly encountered soils from a wide variety of metals.

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Position_____
Address_____
City_____ State_____

to Control the Aluminum Bright Dipping Process" by G. D. Nelson and C. J. Knapp which appears in the September 1961 issue of Modern Metals magazine. Thank you.

"L"—Boston

MM—This is just one of the many requests we have received. This 5-page report details a new control procedure for aluminum bright dipping baths. Apparently, it promises to solve some problems that have vexed many firms that finish aluminum. The article has been reprinted, and a copy has been sent. We still have a few copies left.

Developing Aluminum Farm Equipment

Sirs:

At the suggestion of Harvey Aluminum, we write to inquire of your interest in new ideas and designs for the use of aluminum extruded materials in livestock barn operations.

Recently we have developed several practical items, and are interested in publicizing these profitably.

"E"—Pa.

MM—Considering the recent gains in sales of farm machinery, you've picked a promising field. Many farmers have been impressed by aluminum's performance in roofing and siding; are probably pre-sold on aluminum for the type of products you are developing. Send us the information; we'll see if it is suitable for editorial use.

Venetian Blind Maker Wants Forming, Finishing Equipment

Sirs:

We are manufacturers of venetian blinds and are interested in obtaining forming equipment to form aluminum strips 2" wide x .010 to .012 thick with approximately 3/16" camber.

We would also be interested in getting machinery for giving a stove enamel finish.

We shall be glad if you will kindly offer us suitable machinery together with pamphlets, literature, etc. at an early date.

"G"—India

MM—We have sent you names and addresses of U. S. firms that build the type of forming and finishing equipment you need. You will probably be hearing from them soon.

More Competition: Plastic Windows and Doors

Sirs:

I would appreciate it if you would forward to me all the information you have regarding B. F. Goodrich's white rigid Koroseal (vinyl).

I read of this in the August issue of your magazine and I am interested to learn more of it. Thank you.

"P"—Calif.

MM—This is one of several letters concerning the item in our August "Looking Ahead" column, reporting the new Koroseal windows and doors brought out by B. F. Goodrich. We noted, among other things, that Goodrich had taken on 14 fabricators "from Maine to Nebraska, to produce and sell windows and doors made of the material."

We also commented to the effect: "Aside from the price-cutters, here's a new element to beware of." Maybe some aluminum window and door outfits are thinking of joining this new competition rather than fight it.

Unfortunately, we cannot send you the information from which our reports were taken. Maybe you can get it from B. F. Goodrich.

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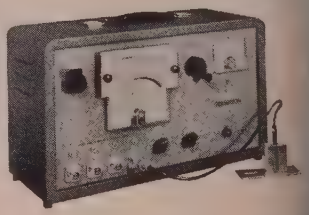

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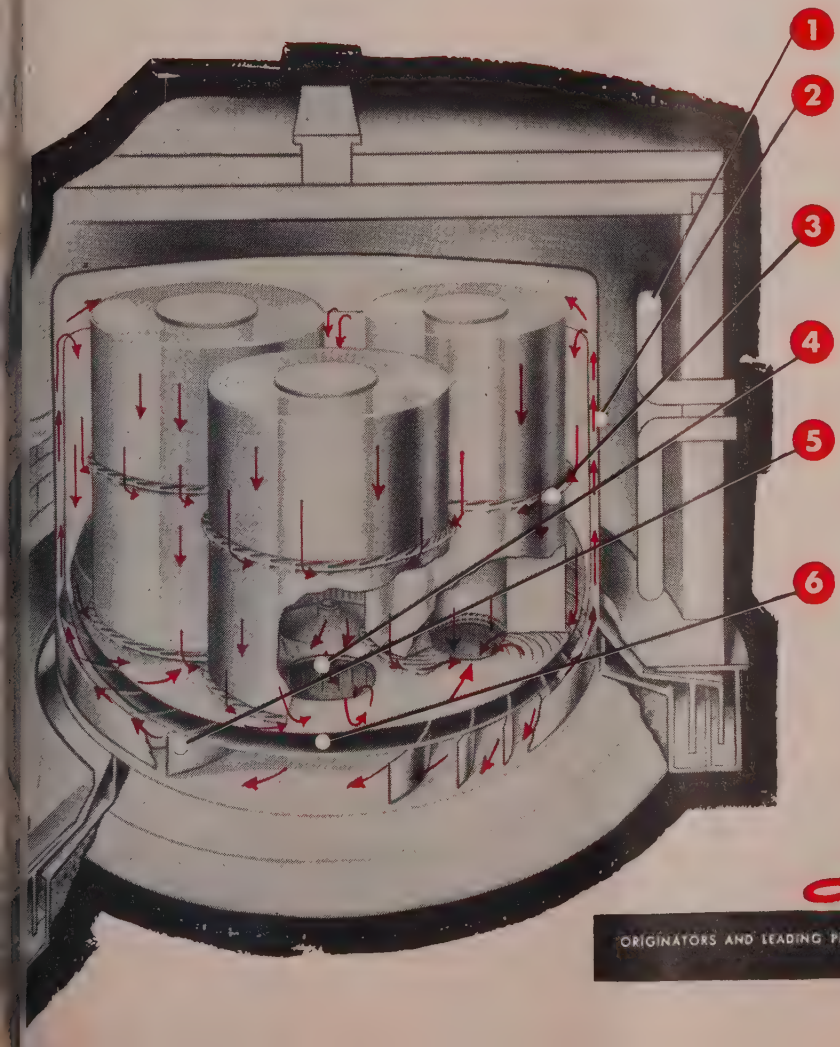

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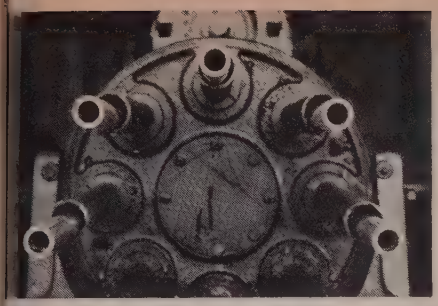
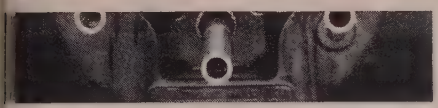
Military Markets « « Production of combat hicles for the Army is being stepped up substanti General Motors' Cadillac Div'n has received cont for vehicles that use big quantities of aluminum. sult: Improved mobility and greatly increased fire er for front line troops. The three vehicles invol all developed by Cadillac, include: The T114 arm reconnaissance carrier; the T195 El self-propelled howitzer; and the T196 El self-propelled medium itzer. The T114 is a tracked vehicle that has to be in weight for air transport and amphibious use. minum comprises 6500 pounds of its total, ready action weight of 13,500 pounds. Each of the two carriers contains about 14,000 pounds of alumin The Army has also taken steps to speed productio the M-113 troop carrier, a combat vehicle that is erally endowed with aluminum armor plate. Fi about 10,000 pounds of aluminum in each of th Early adoption of lightweight combat equipment is now in the prototype or developmental stages w further increase aluminum consumption which, acc ing to George Bailey, manager of the Federal sales vision of Reynolds Metals, is estimated at 20,000 of sheet and plate in fiscal '62 and 35,000 tons by 1 This is for the Army's tank-automotive program al "Similar increases can be expected in a numbe other military categories," Bailey added. Increased s ments of aluminum aircraft sheet, plate and extrus will result from the additional procurement of Force cargo and transport planes, he said. Mili hardware is becoming a huge—and regrettable—r ket for aluminum.

Fiber Research Booms « « Several weeks b Mead Corp., Chillicothe, Ohio, formally opened new $4.5 million research center and thereby focu attention on an expanding technology. Mead po out that wood fiber has the strength of some grade steel when bonded properly. It suggests that cellu fibers might in time become another source of an ance for aluminum proponents. Mead Corp. has b developing papers from glass, asbestos, rayon, ac fiber, zinc, silver, aluminum and other materials years. The aluminum fiber paper will have use wh electrically conductive materials are required.

A Date with Estes? « « Now that convulsions in aluminum industry have caused Senator Kefauver look in this direction, one can expect that quite a men in the business will be in for some trying mome in the weeks ahead; that is, if Kefauver's Senate A Trust Subcommittee decides to go ahead with a dress investigation. Presumably, a preliminary ex ination of records subpoenaed from a few compa will reveal to the group what must be done. It n hardly be mentioned that pricing practices in the dustry will be one aspect of the subcommittee's resea And there's the melancholy possibility that the com tee already has evidence of other types of malfeasa If the Senator from Tennessee *does* decide to go ah with hearings, one can expect a "no holds barred" t



Cut Material and Machining Costs



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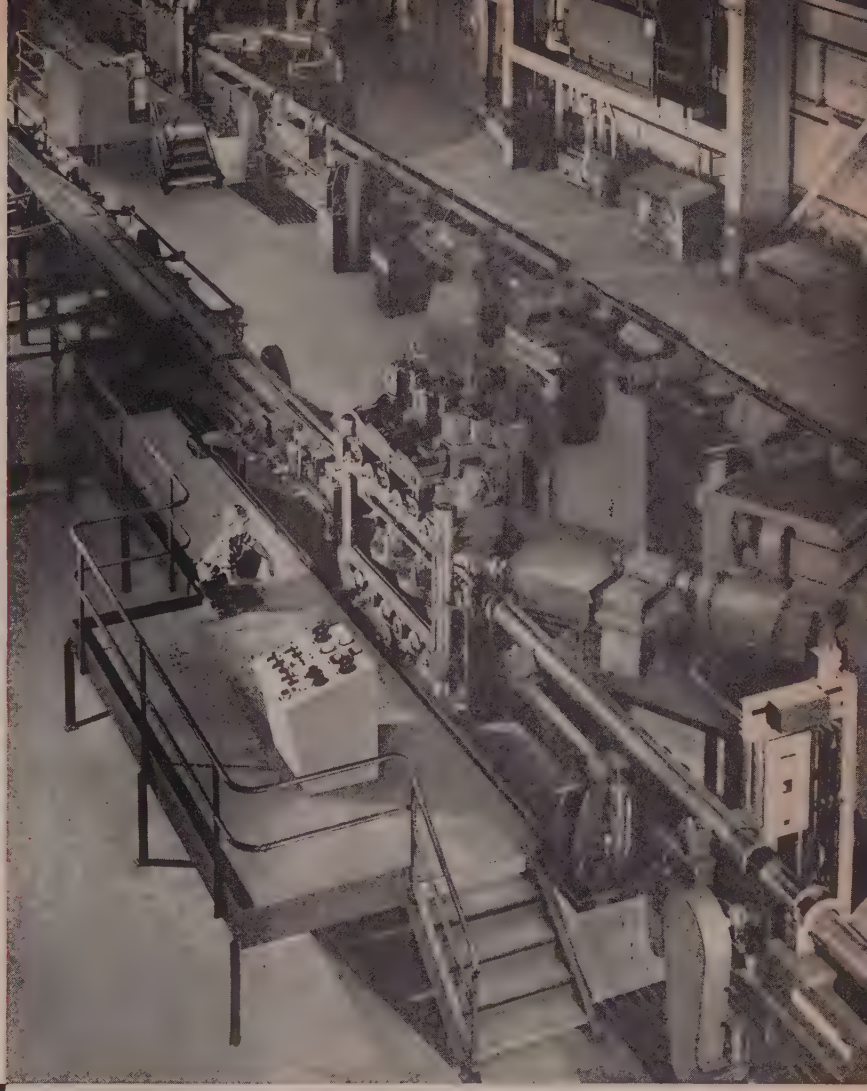
of show which will bear little resemblance to th
sions held in recent years by the Yates Subcomm
What has happened, apparently, is that complaints
customers of the primary producers have been br
to Kefauver's attention. A Subcommittee spoke
has stipulated the charges without revealing thei
eral sources. So far, the committee has been stra
vague as to what it has in mind. Whatever the
is planning, we see little or no similarity between
ing practices in the aluminum industry today an
conditions that led to some sensational anti-tru
tions of the recent past.

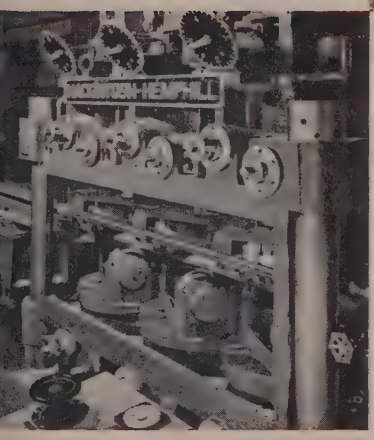
Foil's Future « « As women continue to swel
ranks of the breadwinners they have less time for
ing. This has led market researchers to come up
another forecast for aluminum foil: "Some 2 b
containers will be used by 1965 for fresh and f
baked goods." J. R. Kitchen, product manager fo
containers for Kaiser Aluminum, recently made th
diction at the Bakery Exposition in Atlantic City, "
convenience foods are expected to be sold as inc
continue to rise, and also as a result of the predi
that 35% more housewives will be working in the
than in the 1950s," he explained. There are othe
tors favoring increased foil usage. Baked product
figure importantly in the automatic vending ind
and aluminum foil's popularity as a serving dis
sures its heavy use as a "start-to-finish" container —
bakery to retailing shelf to housewife's serving dish

Huge Scrap Reservoir « « Aerial bombs with
nesium bodies are still a big item in the govern
surplus market. The General Services Administr
is scheduling sales at intervals of about six weeks
all are sold. More than 1,100,000 pounds of magne
scrap have been obtained from bomb sales at the
Arsenal at Pine Bluff, Ark. Another arsenal, at To
Utah, has a huge quantity of the weapons. Ame
Smelting & Refining Co., Houston, submitted high
on three lots of the scrap — 400,000 pounds, in all —
paid $105,552 for it.

Glamorizing Pots and Pans « « Wear-Ever
minum, Inc. aims to turn the lowly cooking utens
to an impulse item in retailing. A new point-of
chase display stand, combined with judicious sp
prices of six low-cost Wear-Ever utensils, scored a
chandising bulls-eye. So Wear-Ever extended the
30 days beyond its original 90-day period and incl
3000 additional retailers in what was originally pla
as a limited campaign. According to James Strat
Houseware Div'n sales promotion manager, plan
of the spot promotion began with choosing six ute
— pots and pans known to be good sellers. It wa
ready known that the majority of impulse buyers
spend up to one dollar for useful though not criti
needed items. New below-$1 price tags were give
three utensils. Three others had regular prices. A
capacity, compact floor stand made an important
tribution to the merchandising coup. It was desi
and manufactured by Stone Container Corp., Chi
packaging and merchandising specialists. It must
been good; it sold more than 230,000 utensils in
days.

ıy Mack-Hemp straighteners were selected for the world's most modern ontinuous weld pipe mill





The new continuous pipe mill at Lorain Works of U.S. Steel's National Tube Division is probably the most productive facility of its kind in the world, exceeding the record-breaking pipe mill at Fairless Works.

With straightness and roundness of delivered pipe more critical than ever, the Lorain Works assigns this important finishing task to two Mackintosh-Hemphill 6-roll guideless rotary straighteners. The two can process 1800 feet of pipe per minute. Finished pipe is perfectly straight and round, without spiral markings. "End hooks" at back and front are completely removed. Moreover, the straighteners' open three-post construction makes the rolls readily accessible, so that set-up time is cut to a minimum.

If you're concerned with straightening pipe or tube—no matter what the diameter or wall thickness—it will pay you to talk to Mack-Hemp. We have helpful information for you.

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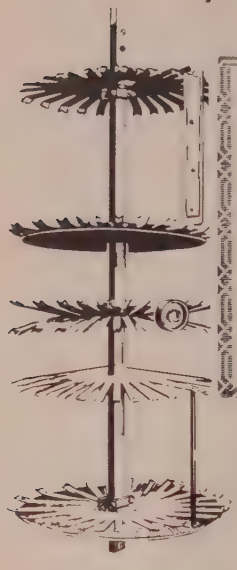

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Useful Data

Refractories in ring-type carbon baking furn are covered in a reprint of a conference paper prep by two engineers of Harbison-Walker Refractories 307 Fifth Ave., Pittsburgh 22, Pa. These furnaces such as are used for baking anodes in the alumi industry. The paper discusses the significance of spe design in the intricate flue system, how to select pr refractories to insure stability of flue construction, all economy, and importance of refractory maintena For your copy ask Robert R. Miller.

Multiple purpose, spring pin fasteners are catalo in booklet 860 produced by Elastic Stop Nut Corp America, 2330 Vauxhall Road, Union, N. J. The pin fastener is described minutely in this catalog, cluding a series of drawings showing how it can rep 12 different fasteners. Various charts and tables shown to indicate Rollpin's production advant compared with other fasteners, average maximum moval force, re-usability factors, etc. Bruce Link send this on request.

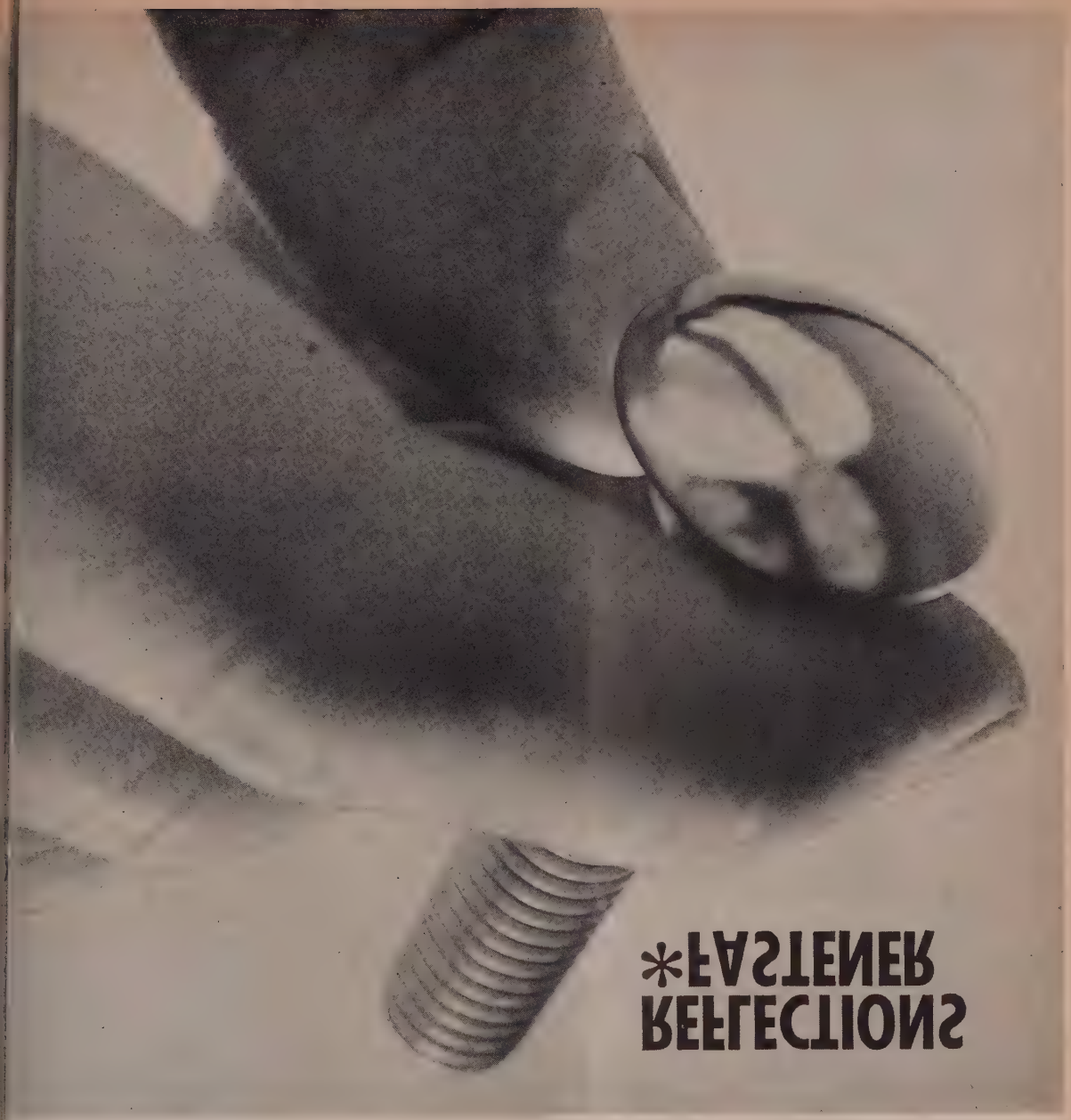
Conversion coating compounds made by Oakite P ucts, Inc., are described in a four-page bulletin lished by the company. The Oakite Chromicoat ess applied by spray washing systems and dip t are detailed. The bulletin also explains the import of the conversion coating for aluminum. E. L. Car will send this folder. Address him at 19 Rector New York 6.

Metal spinning techniques are described and tured in a bulletin on the subject published by P nix Products Co., Metal Spinning Div'n, 4715 N. St., Milwaukee 9, Wis. The bulletin purports to s how spun metal components can be applied i variety of metalworking activities. This 32-page, illustrated booklet is a short course on the techni and the equipment used. Write to R. J. Geckler fo

Air power presses are cataloged in a new broch published by Hannifin Co., 501 S. Wolf Road, Plaines, Ill., a div'n of Parker-Hannifin Corp. New letin 0960-B1 gives complete dimensioning and tec cal information for all open gap and column Hann air presses in both bench and floor mounted mo Thirty-four press sizes are offered in a broad ch of capacities from as little as half-ton to 50-ton f at 80 psi air line pressure. Ask Z. J. Lansky about data book.

"3M Coated Abrasives" is the title of a 20-page st of the coated abrasive products manufactured by M nesota Mining & Mfg. Co., St. Paul 6, Minn., as as the equipment by which they are used. The boo encompasses such information as descriptions of minerals that do the actual grinding or finishing the backings that provide the bases for the miner and the adhesives that bond them together. Open closed coatings are explained; coated abrasive

(Continued on pag



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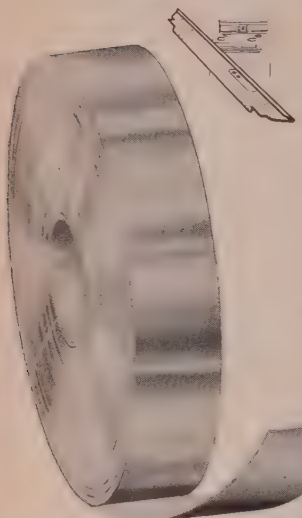

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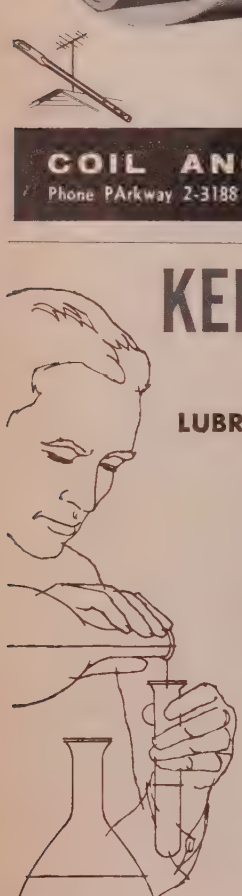

Every manufacturing process is unique. That's why Kerns United, in formulating and recommending a lubricant considers method, machinery, metals and desired end result. Dividend: a *personalized* lubricant that performs at optimum efficiency . . . one that saves tools and production dollars and helps produce a better product.

If you draw, cut, grind or forge metals . . . want to protect parts or clean them more efficiently . . . are looking for a better grease . . . or want greater yield from your cold reduction mill . . . Kerns *has* or *can formulate* a personalized lubricant that will perform consistently better and save you dollars. Call, wire, or write, today!

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PERSONALIZED LUBRICANTS FOR INDUSTRY

forms are pictured and described. Various equipm and coated abrasive combinations are illustrated. M more information is given. Write to Chuck Brand

"Forecast for Finishes in 1962," Modern Metals v of cleaners and finishes application to aluminum some 17,811 metalworking plants in 34 industry gro next year, is available on request to Chris Oberhe 1812 Tribune Tower, Chicago 11.

A **"Digest of Magnesium Specifications,"** Bulle No. 141-138, has been prepared by The Dow Me Products Co., division of The Dow Chemical Co., M land, Mich. This revised bulletin provides a list and brief descriptions of the magnesium specificati issued by Government procurement agencies and te nical societies. Clay Dickey will send this on requ

Die cast and plastic tooling facilities of the R. Schulz Co. are described and illustrated in a four-p folder. Shown are interior and exterior plant pictu and some of the very intricate tooling made for automotive and appliance industries. Write to sales manager for this brochure at 2425 N. 75th A Elmwood Park 35, Ill.

Four Lines of fasteners and their application in dustry are described and illustrated in a six-page g fold brochure produced by Dzus Fastener Co., I Babylon, N. Y. The Standard Dzus fastener is a quar turn, self-locking fastener, claimed to be the m widely used aircraft fastener. It is now used by ot industries. Also described are the Universal Line, use where no sheet separation is permissible un load; the Supersonic Line, specially designed for hi speed military aircraft; and the Panel Line, to facilit quick and easy installation of various lengths of pan on console units and racks. Write to L. F. Acker.

Building and site requirements, a form to be co pleted by site-seeking manufacturers interested in D County (Miami) Fla. is available on request from Dade County Development Department, 345 Northe Second Ave., Miami 32, Fla. Also available is **"An E nomic Survey of Metropolitan Miami,"** factual inform tion about the area which might be of interest to m agement executives. The executive director will se these folders on request.

Coil coatings are described in a new folder recen brought out by DeSoto Chemical Coatings, Inc., 1 S. Kostner Ave., Chicago 23. The four-page, two-col folder suggests the dramatic possibilities for the of precoated coil, and stresses the value of DeSo newest coating product, Acropon, a thermosetting ac lic said to have high durability. Write G. A. Karl.

"Alcoa Aluminum Screw Machine Stock" is a n handbook published by Aluminum Co. of Ameri It replaces two other handbooks covering this materi The book's four tabbed sections cover general formation, properties and tolerances, estimating formation, and tooling and operating data. This 1 page handbook will be sent on request to 728 Al Building, Pittsburgh 19, Pa.

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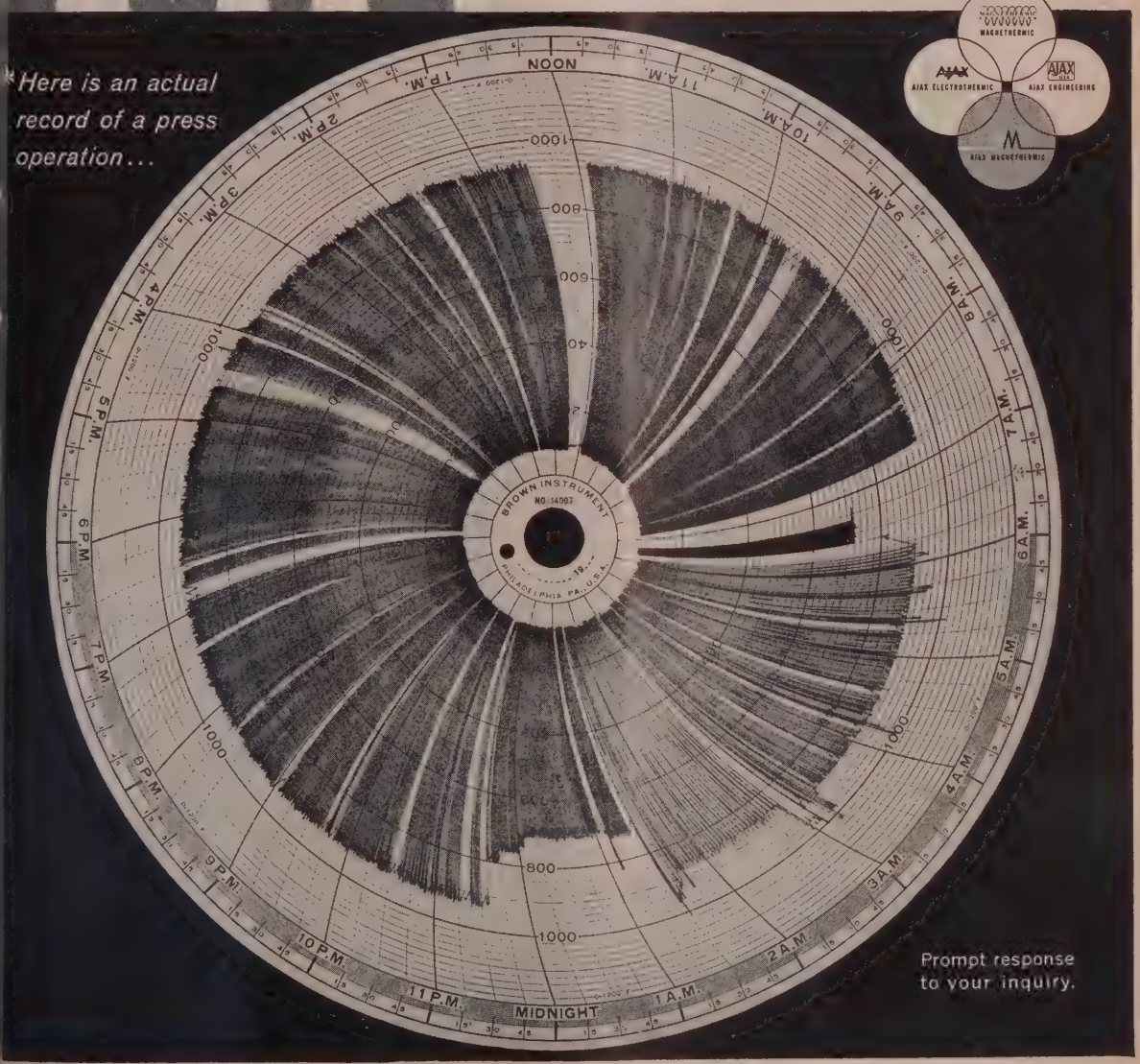

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New Enterpris

Rogers Industries, Inc., 14575 Meyers Road, De 27, has begun production of **aluminum prime winc** at its Fort Valley, Ga., plant. The extrusion firm two other plants (Hutchinson, Kan., and Pom Calif.), located to improve service and reduce shipp costs to regional markets.

A new lightweight **aluminum ladder** has been signed by Sturgis Mfg. Co., Haxtun, Col., for use livestock and grain trucks. The ladder is made with welds from extruded aluminum shapes and solid stock. Both single and double hook models are off in ladder lengths of five, six and seven feet. We range is from seven to nine pounds.

Non-slip **pistol grip for blow gun** is made from aluminum die casting. Poppet action valve controls flow and the standard nozzle may be interchanged all other Schrader fittings or pipe threaded extrusi Maker is A. Schrader's Sons, Div'n of Scovill Mfg. 470 Vanderbilt Ave., Brooklyn, N. Y.

New type of **earth auger** enables gardeners to 4-foot holes one inch in diameter, in one minute. can be partially filled with dry or liquid fertilize feed the roots of shrubs and trees while quenching thirst of surrounding grass roots. Eynon-Dakin Co., Freeland Ave., Detroit 27, makes the aluminum aug

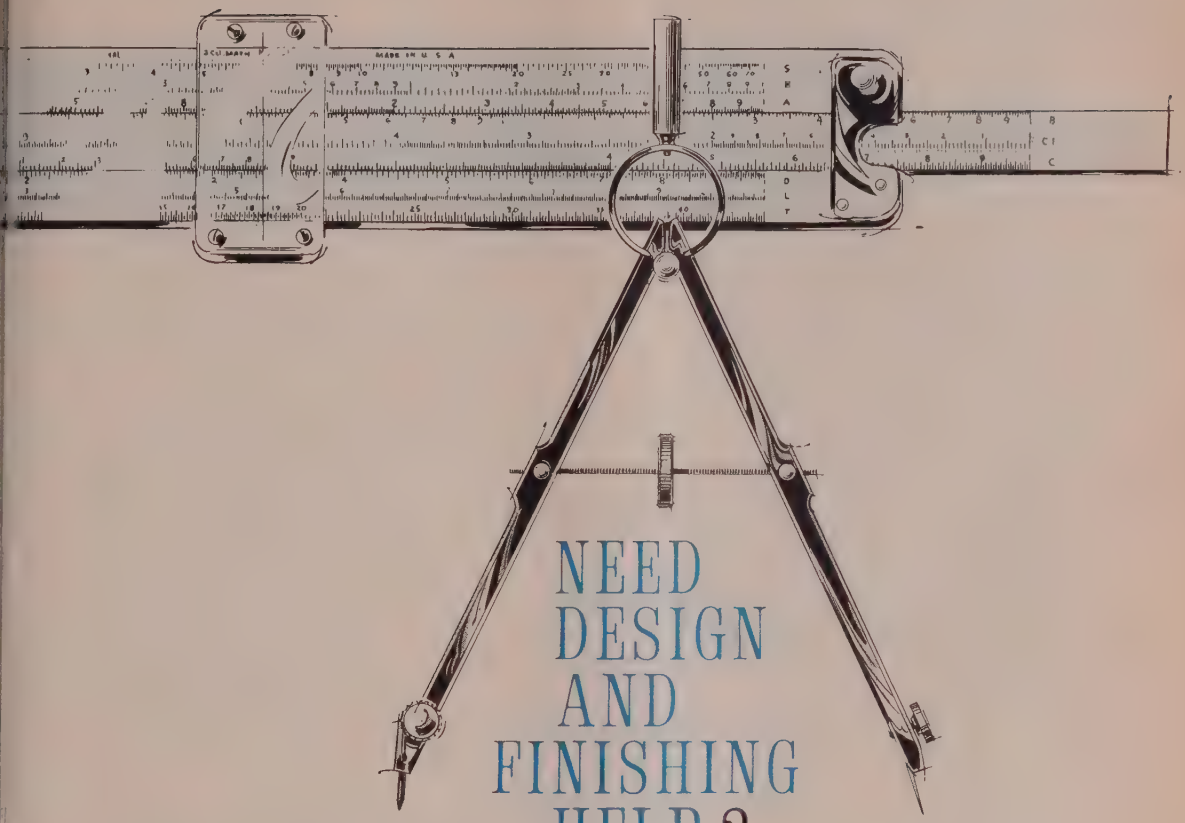
Spectrol Electronics Corp., 1704 S. Del Mar Ave., Gabriel, Calif., encases its new ¾-inch-square trimm **potentiometer** in an aluminum case. Design of component using aluminum allows 3w rated powe be dissipated easily without use of external heat s or additional hardware.

Smart new design of **cup and drop handle** is in a dized aluminum or chromed bronze. Corbin Cab Lock Div'n, New Britain, Conn., supplies the d handle with a choice of cams for 1-, 2- and 3-p locking mechanisms.

Aluminum storage tanks for ammonium nitrate tilizer are fabricated by Moorhead Machinery Boiler Co., 3477 University Ave. N.E., Minneap Minn. The all-welded 22,000-gallon tanks are 1 feet in diameter and 35½ feet long. Aluminum ta (5086 alloy) eliminate loss of product from contan ation due to corrosion.

Mideast Aluminum Co., extrusion firm in Dayt N. J., has acquired 10 acres adjacent to its plant **expansion.** Ray B. Sowers, president, reports the c pany has an engineering contract with the Sut Engineering Co., Pittsburgh, Pa., for the design o new 1000-ton fully automatic, high speed extrus press.

Handi-Pegs are 5/16-inch diameter aluminum r with a special hook end. These pegs slide along



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truded aluminum track to form **adjustable hangers.** Pre-drilled extruded track is fastened by screws on 16- or 24-inch centers. Eight pegs and a four-foot length of track (natural aluminum finish or gold anodized) are packaged and sold through national retail hardware, lumber and building supply outlets. Manufacturer is Mecklenburg-Duncan Co., 4041 Sante Fe, Oklahoma City 5, Okla.

Kerns United Corp., manufacturer of **industrial lubricants,** is settling down in its new executive, sales and general offices at 824 State Street, Calumet City, Ill. "This is the first step in an extensive expansion program to meet a steady increase in sales, give our customers the utmost in service and provide broader product coverage," said B. L. Smalley, president and board chairman.

A new Blaw-Knox single-stand, four-high aluminum cold rolling mill being installed at the Warren, Ohio plant of Bridgeport Brass Div'n of National Distillers and Chemical Corp. will be equipped with a 750-gpm Dravo-DeLaval continuous circulating **mineral oil coolant system.** The system features a new DeLaval diatomaceous earth/Fuller's earth filter, which removes all particles larger than ½ micron.

An aluminum extrusion firm has set up shop in San Juan, Puerto Rico. Called Ivan Megwinoff & Associates, the new outfit will build a 21,000 square-foot plant. The San Juan venture is Megwinoff's second; he has Aluminum Extrusion Corp. in Loiza, P.R. The San Juan operation represents an investment of $800,00

Laboratory, bench or machine tool lighting is m efficient with Multi-Lamp, a portable, **flexible-lamp** which also features a special spun aluminum flector. This component produces non-glare illum tion and is 30% more efficient than other types lighting, says manufacturer, Moffat Products, Inc., N. Washington, Minneapolis 11, Minn.

Precision Lock Mfg. Co., 933 Stanley Ave. Brook N. Y. has been formed by George Friedman. "H quality, **modern locks** fill a definite need in the in try," Friedman said. Included in Precision Lock's will be newly designed cylinder and interior locks electric door openers, sliding door cylinder locks window locks. The firm occupies a $500,000 facility.

Polished stainless steel and aluminum are used i versatile new **gram-ounce scale,** designed for laborat and industrial uses. The scale is calibrated in our from 0 to 16 and in grams from 0 to 450. Weigh pan is 3 by 2¼ inches and scale stands 5¾ inches h It is made by Edmund Scientific Co., Barrington, N

H. H. Scott, Inc., Instruments Div'n, 111 Powder Rd., Maynard, Mass., makes the Model 450 **sou meter.** It measures only 2 x 3 x 6 inches, weighs o 2 pounds, is operated on an ordinary 22.5v battery w an operating life of 30 hrs. Completely transistoriz the meter has a heavy-gauge aluminum case.

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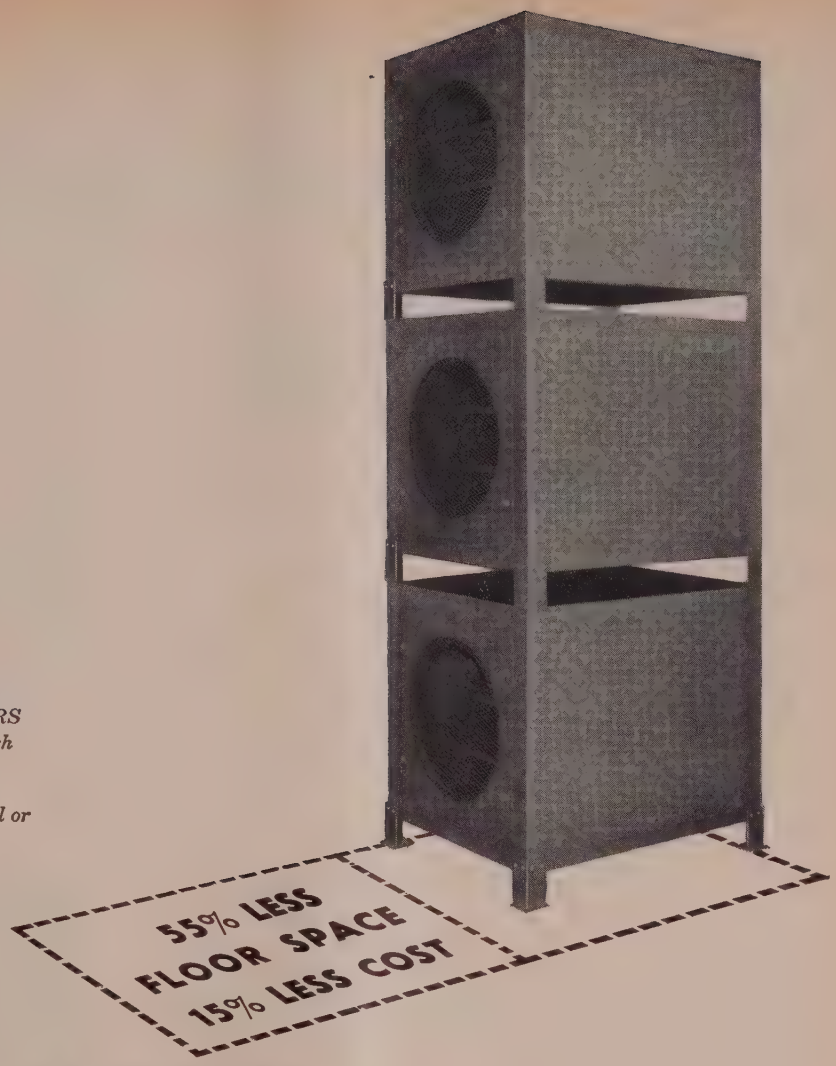

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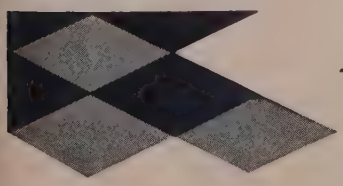

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On The Railroads: Special Cars, Containerization Boost Aluminum Use

Piggyback carloadings this year will more th triple the 1956 figure. Steel is still an item w trailer buyers, but aluminum is slowly gaining ceptance—especially in special purpose cars t make the maintenance job easier for railroad

By H. K. Darby, Associate Editor

■ ***Aluminum piggyback trailers will doubtless be a favorable influence on railroad purchasers.***

THE NATION'S railroads, perhaps the most elusive of all customers solicited by the aluminum industry, continue their role of reluctant patrons, even as evidence grows that the light metal deserves broader use in this field.

The 105 Class I roads spent well over $2 billion for equipment, roadway and structures, and materials and supplies last year, according to the Association of American Railroads. Steel, for replacement uses as well as for original application, accounted for a great part of this expenditure (to say nothing of the rivers of paint that will have to be bought for its subsequent refurbishing). The estimated 10,000 tons of aluminum used by railroads last year amounted to a small share of the total outlay.

But if most railroad purchasers continue to view steel as the only construction material for equipment and hardware, aluminum may have to enter the market via the back door. Piggyback transport will continue to grow increasingly popular, despite the slowup in its growth so far this year (see table, p. 30). Fifty-eight of the Class I roads are established users of piggyback systems. In '55 there were only 19.

The mushrooming growth of piggyback has benefited the trailer and container manufacturers, boosting the consumption of aluminum by this group. Though about 30% of the piggyback trailer market is said to have gone to steel last year—purely because of lower first cost—it is plain to most trailer builders that steel's years are numbered in the big container field.

With the railroads handling as many as 50,000 piggyback trailers each year, most of them aluminum, appreciation of the light metal will "rub off" on many railroaders. It isn't too far-fetched to suppose that familiarity with aluminum will eventually breed adoption.

Three trailer manufacturers were among the exhibitors at the Allied Railway Supply Association show, held last month in the Illinois Central yards in Chicago. Most of them showed aluminum vans.

Aluminum piggyback trailers made by the Kentucky Mfg. Co., Louisville, Ky., typify the exterior post type of construction. They have side panels of 3004-H291 sheet .050-inch thick, alclad one side. Vertical sheets are 49 inches wide and run from top to bottom rails.

Fastening is with 3/16-inch aluminum rivets on 1-inch centers through the rails and on 2-inch centers through the posts. Sheets overlap at joints, and all joints occur on posts and are thoroughly primed and sealed.

The "one-piece" roof is .040-inch thick and fastened to the top rail with rivets on 1-inch centers. The roof sheet is not attached in any way to the rugged extruded aluminum cross bows, bu allowed to "float" on them as trailer flexes. Insulation between roof sheet and cross bows prevents and drumming.

The flooring on Kentucky's alumi vans can be extruded shapes havi section thickness of 0.100-inch and overall thickness of 1¼ inches x 9- board width. For dry freight use floor is likely to be oak plank.

A builder of lading protection de for boxcars is Evans Products Co., mouth, Mich. Evans uses large, i locking aluminum extrusions in new DF-B aluminum moveable b head for boxcars. The bulkhead div lading and minimizes inertia in the when the train stops and starts. It be positioned easily by one man bec of its light weight, plus the fact th is suspended by a 360-degree sw from an overhead traveling beam.

The panel is made up of ten width extrusions, flanked by the s shape cut down somewhat in size. T vertically arranged pieces are we top and bottom to cross-pieces, form a unit 9 feet, 2 inches square. Units uninsulated cars are somewhat lar but unit weight of either size is in neighborhood of 2100 pounds.

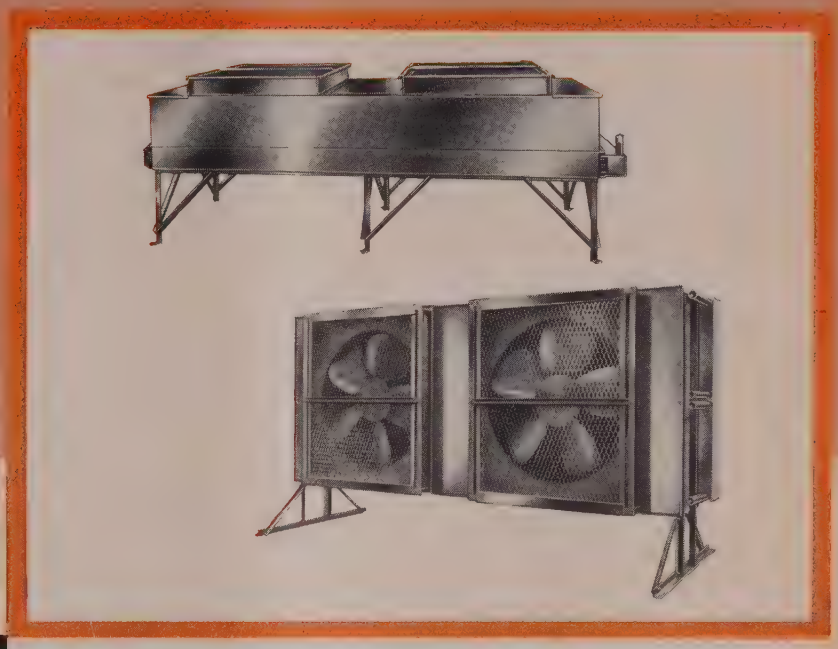
Locking pins at all corners fit holes located in tracks on the f and under the top running rails single lever in the center of the D bulkhead does the locking and unl ing and serves as a handle for posit ing the bulkhead.

Originally, the bulkhead had a l ing pin engaging holes in a ce track in the floor of the car. Evans covered, however, that this impa such unyielding rigidity as to m the bulkhead less safe for the lad Without the center locking pin, aluminum bulkhead will "give" w impact, "just as the wing of an airl does, without permanent distortion

■ ***New Tri-Level Auto Rack designed by Evans Products Co. uses aluminum plate for bridges between cars. Plates are pulled down in circus loading of automobiles.***

48-year-old Kramer Trenton specifies tubing by WOLVERINE

KRAMER **UNICON**



An acknowledged leader in the manufacturing of air-cooled condensing equipment is Kramer Trenton Co., of Trenton, New Jersey.

A prime example of Kramer design is its Unicon model, illustrated above, which, in its largest series, is said by Kramer to have 50% more capacity than any similar unit.

The Kramer Trenton Unicon uses Wolverine seamless copper and aluminum tubing in condensing coils and suction and liquid lines.

Kramer Trenton, now observing its 48th year of heat transfer achievement, specifies Wolverine seamless tube because they know that Wolverine's years of experience and Tubemanship assure them of tubing specifically engineered to meet the needs of refrigeration and air conditioning equipment manufacturers.

Next time you order seamless copper, copper alloy and aluminum tube—specify Wolverine. Like Kramer Trenton, and other leading American manufacturers, you'll be getting the high quality that comes only from years of experience in the manufacture, fabrication and application of tubing. Write, now, for your copy of Wolverine's Tubemanship Catalog.

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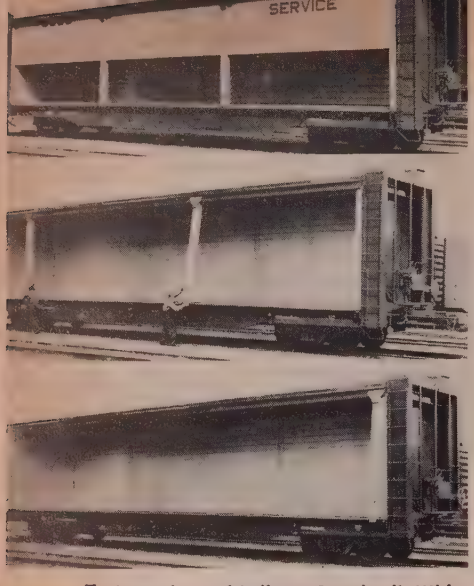


■ *Three views of Pullman-Standard's Widespan doors in action. Top photo shows man at left operating wheel to open the spring counter-balanced doors. All three doors open at same time, thanks to aluminum's light weight. Middle photo shows aluminum posts being moved to ends of car to grant greatest opening.*

'set'." Evans points out that the aluminum's resilience is 50% greater than that of steel.

The aluminum bulkhead and its track system ranges from 1000 to 1200 pounds lighter than "competitive devices," and allows greater loading capacity per car.

"Aluminum bulkheads are rust-free," the company says. "This becomes very important when the bulkhead is used in a mechanical reefer and/or insulated car, and in other cars when humidity reaches 100%. Since no painting is required, the aluminum bulkhead will be maintenance-free and give extended life. There is never any fear of contamination of food products."

The standard installation is two bulkheads per car, to split a 120,000-pound load into three units.

Pullman-Standard Division of Pullman, Inc., has what it calls a Compartmentizer, produced both in steel and aluminum, and made in two models. The older Model K is built by welding pressed aluminum sheet, ⅛-inch thick, to 3/16-inch thick rolled shapes. These Pullman versions are two gates having an overall thickness of about 4 inches, and each weighing about 433 pounds, or about 865 pounds for the unit Compartmentizer. Each gate is about 4 feet wide and 8 feet high.

Lightweight Dividers

Use of aluminum in the new Model L Compartmentizer is still confidential. In this design the aluminum gate weighs 300 pounds and there are only two locks per gate.

Also featured at the show was the new Pullman-Standard "Full Door" boxcar (see photos, p. 30). This new development, which uses 8400 pounds of aluminum per carset of Widespan doors, is viewed as potentially the "all-purpose car of the future" by D. W. Brosnan, operating vice president of The Southern Railroad.

Regardless of what the car might mean to The Southern, which broke the ice with its order of 200 of them, Pullman-Standard engineers believe that this car will be an important mea winning back business that has lost to the motor freight compani

"It's an All-Door car, ideally s for a wide variety of loads," Pull Standard people say. "Packaged crated merchandise, machinery, sheets and plates, tin plate, to me a few, are products which the roads can anticipate handling."

The doors are made of 16 extr aluminum boards, fastened tog with a hook joint at the top and tapping screws at the bottom to hollow box sections with an int hinge which extends the full leng the door.

"An important feature of the d is that individual panels can b

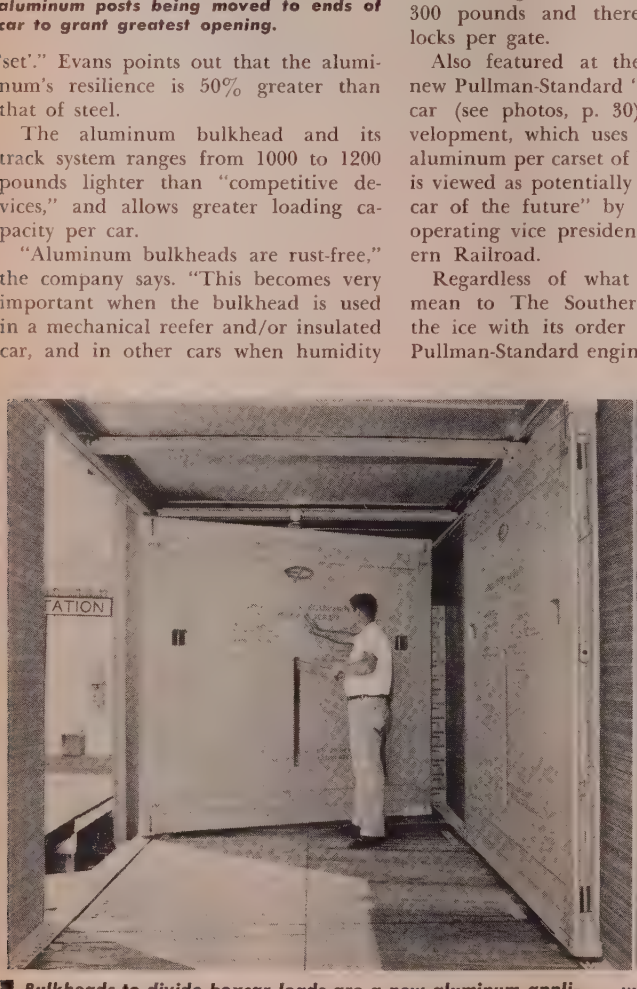
Growth of Piggyback Traffic

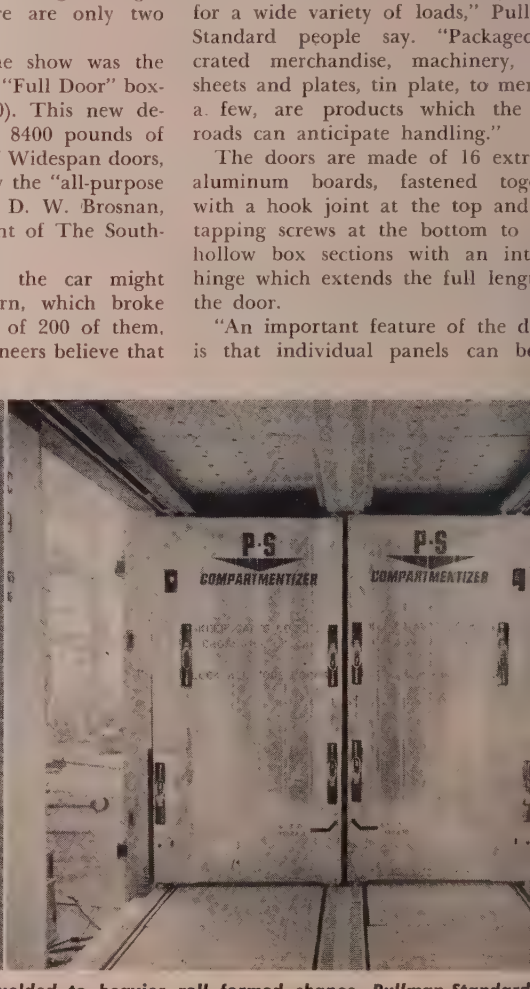
	Cars Loaded with Revenue Trailers	Averag Number Trailer Per Ca
1955	168,150	1¼
1956	207,783	1¼
1957	249,065	1¼
1958	278,071	1½
1959*	416,508	1⅝
1960	554,115	1¾
1961 (7½ mo.)**	360,967	1⅞

*1959 carloadings represented about a 3 increase over '58.

**The first 7½ months of 1960 had loadings totaling 348,417.

Association of American Railroads fig





■ *Bulkheads to divide boxcar loads are a new aluminum application. At left is the DF-B divider, made by Evans Products Co., and using aluminum extrusions that are welded to top and bottom cross pieces but not to each other. Pullman-Standard's Compartmentizer, shown at right, uses pressed aluminum sheet welded to heavier roll formed shapes. Pullman-Standard now brought out another model, made of aluminum or t Light weight of the aluminum models allows manipulatio one man, speeds loading and unloading. Amazing growt piggyback freight should help aluminum.*

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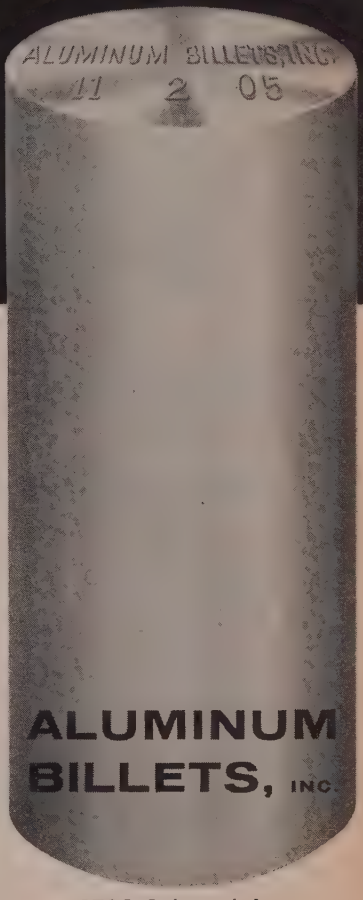
For more information, write or call Aluminum Billets, Inc., one of America's oldest independent suppliers of aluminum billets. Remember, Aluminum Billets, Inc. participates in conversion arrangements . . . and stays competitive.



3786 Oakwood Ave.
YOUNGSTOWN, OHIO

placed without taking the entire door apart," a Pullman-Standard engineer said. Each of the six doors—three doors on each side—is 17 feet long and weighs 1400 pounds.

Auto Rack Is New

Another innovation at the show was a lightweight, three-level freight car, equipped with a new shock absorbing underframe. Designed by Evans Products Co., the car will transport 12 standard or 15 compact automobiles. The only aluminum component on this Tri-Level Auto Loader Rack, is the collapsible bridge plate—one for each track, at each level, at both ends of the car, or 12—for circus loading of the entire train. Aluminum's light weight makes it easy to raise the bridge plates when they're not in use.

The tank car segment of the freight car building industry continues to favor aluminum for transporting many chemicals. General American Transportation Corp., Chicago, will soon start filling an order for 120 aluminum tank cars for Armour & Co. for the transport of liquid nitrogen fertilizer. It is one of the largest single orders for this type of car ever placed.

The tanks will measure 31 feet, 10 inches between heads. Alloy 5454 aluminum plate 25/32-inch thick will be used

■ ***General American Transportation Corp. will build 120 of these 10,000-gallon tankers for Armour & Co. Car has an aluminum tank inside steel shell.***

in tank bodies, using three pieces 90¾ inches wide x 383 inches long. These pieces will be roll formed in a pyramid roll to the required curve to form an 85-inch diameter tank body when they are welded together.

Tank heads will be pressed from 108-inch diameter blanks to produce dished and deeply flanged heads of the same thickness as the tank body metal. Addition of the heads will bring tank length to 35 feet, 10½ inches.

Each body segment will weigh 2715 pounds; two end heads will weigh about 1405 pounds. Aluminum angle and bar strip for reinforcement and extra sheet for the car's manway nozzle total about 550 pounds. Thus, more than 10,000 pounds of aluminum will be used for each car.

Steel shells will be fitted over the 10,200-gallon capacity cars. Between the steel and the aluminum will be 4-inch thick fiberglass blocks bonded to the aluminum and to each other with adhesive, then lashed to the aluminum tank with baling or chicken wire.

Construction of the cars will be underway in GAT's Sharon, Pa., shops in November. Delivery will begin in February, 1962. Each car will cost about $20,000, compared with $14,000 for a similar steel tank car.

On exhibition at the show was Kasser's prototype tubular hopper car, 100 of which will be built by the American Car & Foundry Division of ACF Industries, Inc. for alumina transport service. This high-capacity car (103 tons) uses 12,000 pounds of aluminum plate and 3000 pounds of extrusions. Its design eliminates the center sill, side posts and cross bearers of conventional hopper cars. Unloading is accomplished through eight discharge gates located on the center line of the car, two for each of four compartments.

Neil Zundel, industrial market director of Reynolds Metals Co., hailed aluminum's recent gains in freight car construction, saying that they mark the metal's growth from a job shop metal to a mass production material.

Bless Those Big Containers!

The Reynolds executive cited the 10,000 tons consumption by the railroad industry and predicted that demand will double by 1965.

"Considering the role containerization is expected to have eventually, we believe there is a potential 150,000-ton annual market for aluminum in railroad uses," he said.

George L. Green, marketing vice president of Pullman-Standard Division points out, however, that a trend started in 1960 and is being continued this year: Practically all orders placed for cars have been for comparatively small lots.

"They are for cars designed and built to do a specific job for railroad customers," Green said. "This change in buying habits clearly demonstrates that the railroads are ready and willing to meet the challenge of competition in the battle for the transportation dollar, and that they intend to buy the special equipment needed to attract shippers."

Green said that aluminum "definitely is finding a place in this trend to special cars." Part of the requirement for special cars has been the specifying of larger doors on box cars, he noted, adding that the full-door box car designed by his company would not have been possible without aluminum.

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MERGER AIMED AT MOBILE HOMES MARKET

Hunter Engineering and Automat Metals join forces in bid for bigger share of one of prepaint sheet's brightest growth marke

THE mobile homes industry is a tempting target for suppliers of prepainted coil. An estimated 20,000 tons of aluminum sheet went into the manufacture of the 162,000 mobile homes shipped in 1959.

Sales of haulable houses slipped slightly last year — though they still accounted for about 13% of total single-family housing starts — but shipments have bounced back in 1961, and are expected to top the 1959 level by about 10%. That would push the industry's volume close to $740 million, with aluminum sheet consumption totaling at least 22,000 tons.

Industry forecasts vary somewhat, but sales of mobile homes are expected to reach the 200,000 level by 1963. In the unlikely event that there is no gain in pounds of aluminum per coach, this would add up to a market for some 25,000 tons of aluminum sheet (this does not include extrusions, castings, etc.).

On the other hand, mobile homes continue to get bigger and flossier — which means more sheathing per unit—and coach manufacturers have taken a distinct liking to prepainted sheet. The elimination of in-plant painting is a boon to them — particularly the smaller outfits — and the durable new baked-on coatings give them a potent sales pitch.

Add to this the fact that a few mobile home makers are slowly edging their way into allied fields such as prefabricated homes, motels and vacation cottages, and you have what shapes up as one of the brightest growth markets for prepainted aluminum sheet.

But there's one big drawback: This is an industry of relatively small outfits, and they're scatter all over the landscape. In the days before the big war, better th 90% of the mobile homes were bu in the midwest. Today, less th 42% of the industry's output con from Illinois, Indiana, Michig Ohio, and Wisconsin.

Manufacturers in west coast sta account for a good 25% of indus volume, while another 11% con from the southwest (Texas, Ok homa, Louisiana and Arkansas).

Regional Business Because . .

The building of mobile hom has become a regional business mainly because of sky-high shippi costs. (Five or six years ago a man facturer had to shell out as mu as 30 to 50 cents a mile to haul mobile home from factory to m ket.) Another factor: A decentraliz industry is in a better position cater to regional tastes; to tailor product to suit differing clima conditions.

Both Hunter Engineering Co. a Automated Metals Corp. undoubte ly weighed these and other cons erations before completing t merger recently announced by Di Brill, president of Hunter, a Henry M. Hanson, president a founder of AMC. In their joi statement, Brill and Hanson not that the move was designed to c ate a "raw material to finished pro uct source of supply" for the mobi home industry.

Viewed in this perspective, t marriage looks like a natural. At 300,000 square foot plant in Riv side, Calif., Hunter Engineeri produces coiled aluminum she using the Hunter-developed she casting process, and prepaints coil sheet with the company's recent unveiled roll-coating line (see MM May '61, p. 43).

AMC is essentially a fabricato

Inking the pact that made Automated Metals a fully owned, though independently operated, subsidiary of Hunter Engineering. Dick Brill (standing) is president of Hunter Engineering; and Henry Hanson is president and founder of AMC.

PMD

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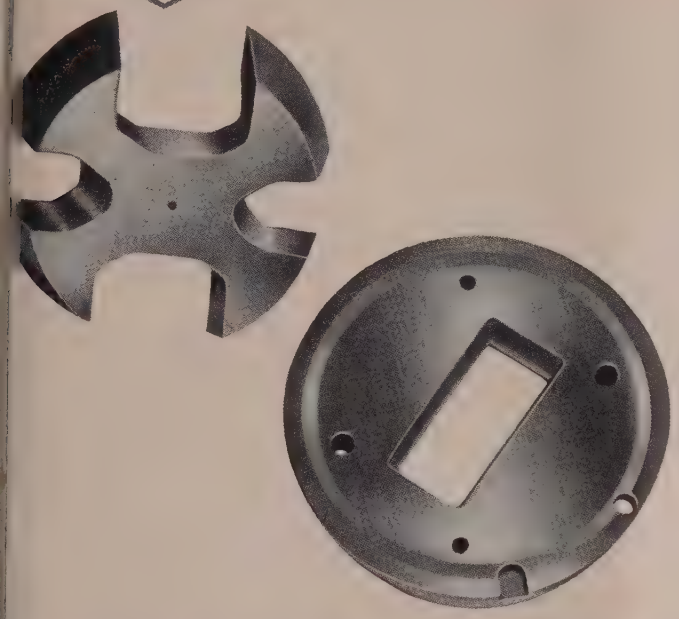

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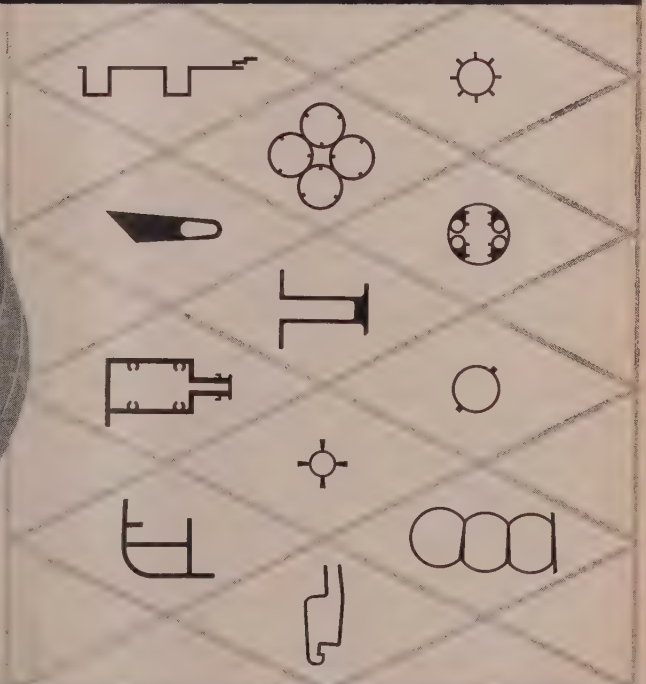

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distributor of custom-formed aluminum components for mobile homes. With its industry-oriented distribution network, its own fleet of trucks, and its four strategically located fabricating plants, AMC can offer one-day service to some 80% of all mobile home manufacturers. The company reports that it supplied almost one-quarter of the aluminum sheet used by the industry last year.

The merger was actually more in the nature of an acquisition. Hunter Engineering acquired all of AMC's outstanding stock in exchange for a "substantial" number of shares of Hunter stock, Dick Brill revealed.

"Since Hunter Engineering is a closely held corporation," he explained, "we maintain a policy of not disclosing specific information on stock ownership."

Hunter's Reasons

Both Brill and Hanson pointed out that the arrangement will not materially affect AMC's status as an individually operated company. It will be run as a wholly-owned subsidiary, "drawing on the facilities and personnel experience of the Hunter staff while continuing to specialize in the fabrication of aluminum for the mobile home and travel trailer industries." Hanson will remain as president of the subsidiary.

"Our primary reason for acquiring Automated Metals was to get a step closer to what we consider one of aluminum's greatest growth markets — mobile homes," Dick Brill explained. "Indirectly, of course, we will be furnishing formed panels for vacation cottages, motels and prefabs because many of AMC's mobile home customers are expanding into these fields."

But Automated will continue to buy a sizable tonnage of aluminum sheet from other sources. A big share of its output requires 48-inch wide sheet, which is beyond the width capacity of the four sheet casting lines at Hunter. (All four lines are 40-inch units; have a total capacity of 3 to 4 million pounds of aluminum reroll stock a month.

Brill also referred to the far-flung nature of the industry. "Even the major mobile home manufacturers have dispersed their facilities to reduce freight costs on finished units," he remarked. "As a result, requirements are for relatively small quantities, special patterns, and a variety of colors.

Hanson's Background

"This combination makes it impractical for any mill to service the industry directly. We at Hunter recognize that Automated's four strategically located fabricating plants provided the ideal answer. Automated occupies a unique position in the mobile home industry. Henry Hanson has developed special equipment to efficiently produce a variety of panel designs. He has actually created a new industry," Brill added.

Hanson entered the mobile homes business through the retail end — that was 20 years ago — and soon graduated to wholesale distribution, then to manufacturing. His own problems as a builder set Hanson to thinking in terms of a wholly new role in the industry — that of a custom fabricator of aluminum exterior panels for other manufacturers. His reasoning: Lump together the many small orders from various manufacturers, and you'll have enough volume to justify a custom fabricating setup.

His first approach was a unique "portable factory" — a 40-foot trailer, crammed full of fabricating equipment. He would shuttle back and forth between manufacturers, forming side panels and other parts on the spot.

■ *Levelling precoated aluminum sheet prior to forming operation at Tulsa, Okla., plant of Automated Metals. The company reportedly supplied about 25% of aluminum sheet components used in mobile homes last year.*

Before long, volume outgrew th capacity of the factory-on-wheel and Hanson's enterprises took roo in Glendora, Calif., where he bot built mobile homes and fabricate components for other manufa turers. That was 10 years ago. Th mobile home manufacturing bus ness was eventually abandoned an Hanson concentrated on custom fa ricating.

The business flourished, and i 1954 AMC moved into bigger hea quarters in Upland, Calif. Branc plants were opened in Elkhart, In in 1958 and in Ocala, Fla. an Tulsa, Okla. the following year. To day, AMC operates more than 100 000 square feet of manufacturin space.

Product Roster Growing

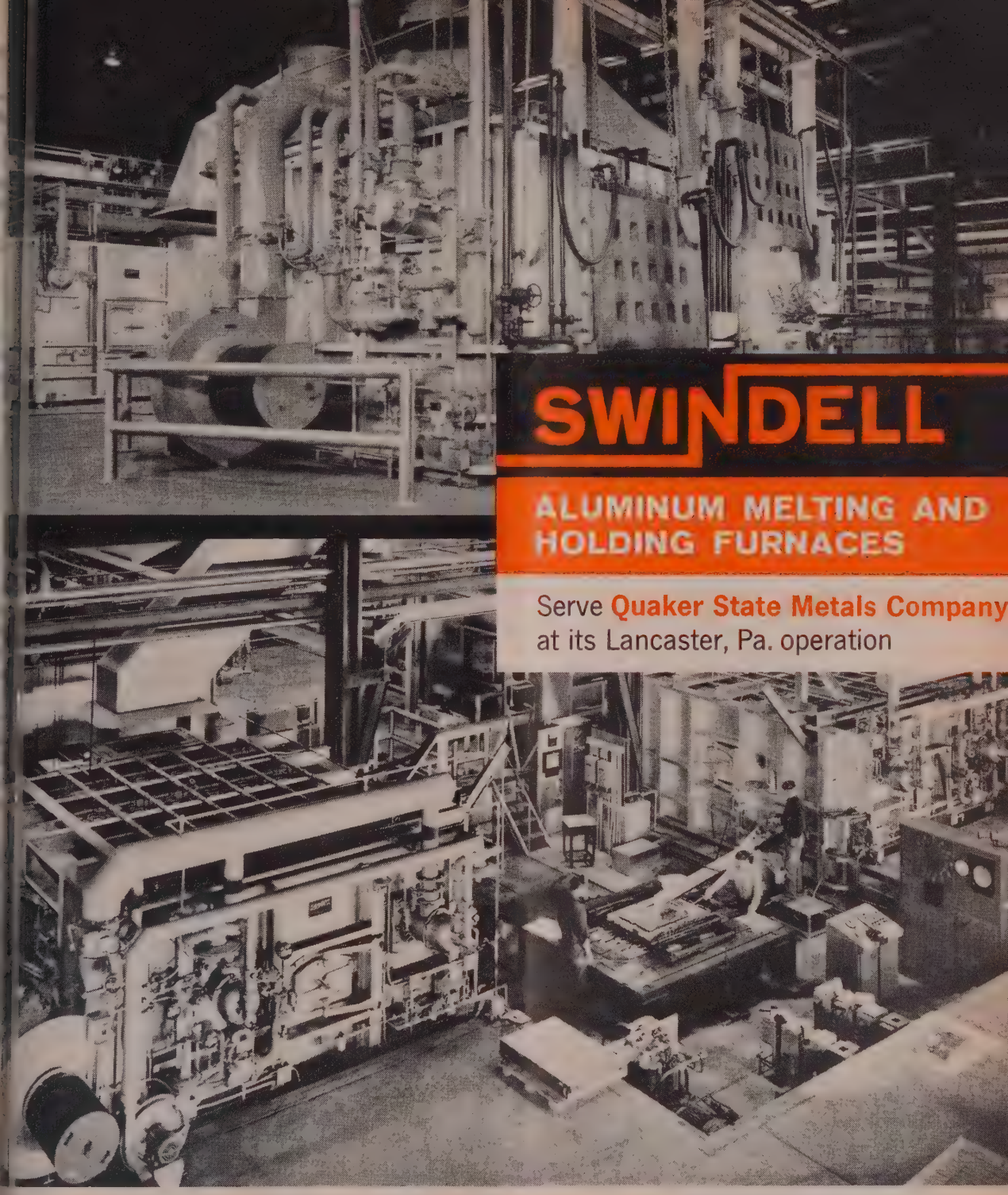
In its role as a prefabricator fo the mobile homes industry, Aut mated's big volume item is pr formed and finished side panel made to the individual manufa turers' designs. But the product mi is continually being broadened. R cently, for example, the compan brought out a new line of awning with matching mobile home skir (they enclose the space below a anchored coach, concealing unsigh ly supports, etc).

Another new product is an ou side locker, much welcomed by m bile home dwellers in need of mo storage space. All of these produc are made of prepainted aluminum in a broad selection of colors.

Hanson is confident that his ne affiliation with Hunter Engineerin will give AMC the added push needs to expand its role in the in dustry.

"Hunter will provide the desig and engineering talent necessary fo continued leadership in this rapidl expanding and constantly changin industry," he explained. "Thu AMC will be free to concentrate i efforts in the areas of increased pr duction and creative sales progra ming."

He is also mindful of the adva tages Hunter has to offer as a sour of supply. "Close control of the al minum, from ingot to painted, c and formed sheets, has long bee our goal," he added. "That goal now a reality."



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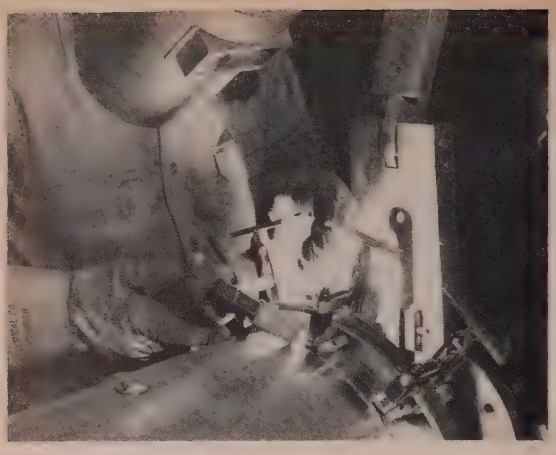


JOINING MAGNESIUM, PART 1:

ARC WELDING

Arc welding (metal, tungsten-inert-gas) is detailed in Part 1 of three-part series on Joining Magnesium. Next month: Resistance and Gas Welding, Brazing.

From Information In "Joining Magnesium" (Booklet 141-216) By the Dow Metal Products Co., Div'n of The Dow Chemical Co., Midland, Michigan

MAGNESIUM PRODUCTS are joined by most of the welding and mechanical fastening methods common to the metalworking industry. These include gas tungsten-arc (formerly TIG), gas metal-arc (formerly MIG) and resistance welding; mechanical fastening; brazing and soldering; and adhesive bonding.

As in the case with other metals, no single factor predominates when a method of joining magnesium parts is being considered. A joining method is usually dictated by the type of assembly, the equipment and trained personnel in a shop, and the end use of the assembly.

The equipment, materials and operator skill required, the amount of production involved, the alloys to be joined, joint appearance, and the limitations or disadvantages of a given joining method, as well as joint properties and design, determine the economics of using that method.

There are three chief methods of joining magnesium parts — welding, riveting, adhesive bonding — though many others are being investigated. This three-part series will detail arc welding (in Part 1), resistance welding, brazing and soldering (in Part 2), and mechanical fastening (in Part 3). Adhesive bonding will be studied in a new series, "Adhesive Bonding of Light Metals."

Before getting down to the fine details of welding magnesium, the groundwork must be laid by discussing the general welding characteristics of the metal. Two important points are that magnesium has a comparatively low melting point; that its high thermal conductivity and coefficient of thermal expansion will cause distortion during welding if adequate precautions aren't taken. (Physical properties vital to the welding of magnesium are given in Table 1; general welding characteristics, Table 2.)

From the welding standpoint, the rapid oxidation of magnesium when heated to its melting point in air is important. Thus, an inert gas is used to shield the metal during arc welding. A flux serves the same purpose when brazing or gas welding. Such protection isn't needed for resistance welding.

The best welds are made when alloys of the same composition are joined. Wrought alloys are usually welded to other wrought alloys, but cast and wrought alloys can be welded together.

Wrought magnesium alloys rated excellent in relative weldability when arc welded include: AZ31B,C, HK31A, HM21A, and HM31A; those rated good: AZ61A, AZ80A and ZK21A. Arc welding ZK60A isn't recommended.

Cast alloys rated excellent when arc welded are EZ33A and KIA; those rated good: AZ81A, AZ91C, AZ92A, EK30A, EK41A, HK31A and QE22A; those rated fair: AZ63A, HZ32A and ZE41A. Not recommended for welding are ZH62A and ZK51A. (Of course, these ratings are general since design, fabrication and serviceability must be considered when choosing alloy and welding process.)

In all magnesium alloys, the solidification range increases and melting point and shrinkage decrease with general increase in alloy content. In the magnesium-aluminum-zinc alloys (AZ61A, AZ31B, AZ63A, AZ80A, AZ81A, AZ91C, AZ92A), aluminum content up to about 10% aids weldability for it tends to refine grain structure, while zinc content of more than 1% increases hot shor-

Table 1: Mg Physical Properties for Welding

Alloy and Temper	Density lb/cu. in.	Melting Range —°F	Thermal Conductivity at 68°F cgs units	Electrical Resistivity at 68°F microhm-cm
		SAND CAST		
AZ63A-T4	.0656	850-1135	.12	14.0
AZ81A-T4	.0649	900-1115	.12	15.0
AZ91C-T6	.0652	875-1105	.13	12.9
AZ92A-T6	.0659	830-1110	.14	12.4
EZ33A-T5	.0659	1010-1189	.24	7.0
HK31A-T6	.0647	1092-1195	.22	7.7
HZ32A-T5	.0659	1026-1198	.26	6.5
K1A-F-	.0628	1200-1202	.30	5.6
QE22A-T6	.0654	-	.24	6.8
		EXTRUSIONS		
AZ31B-F	.0639	1050-1160	.18	9.2
AZ61A-F	.0647	950-1140	.14	12.5
AZ80A-T5	.0649	900-1115	.12	14.5
HM31A-T5	.0651	1121-1202	.25	6.6
ZK21A-F	.0645	-	.30	5.4
ZK60A-T5	.0659	970-1175	.29	5.7
		SHEET AND PLATE		
AZ31B-H24	.0639	1050-1160	.18	9.2
-O	.0639	1050-1160	.18	9.2
HK31A-H24	.0647	1092-1195	.27	6.1
-O	0647	1092-1195	.25	6.6
HM21A-T8	.0640	1121-1202	.33	5.0

(Coefficient of Thermal Expansion (68°F) 0.0000145 in./in.)

TABLE 2: Magnesium Casting, Extrusion, Sheet and Plate Alloys and Tempers

Alloy and Temper (1)	Nominal Composition—% Al	RE	Th	Zn	Zr	Typical Room Temperature Properties TS—ksi(2)	TYS—ksi	CYS—ksi	E in 2"—%	Characteristics
CASTING ALLOYS										
AZ63A-T4	6.0	—	—	3.0	—	41	14	—	15	High ductility, moderately high yield strength.
AZ81A-T4	7.6	—	—	0.7	—	40	14	—	15	Ductility, yield strength comparable to AZ63A.
AZ91C-T6	8.7	—	—	0.7	—	41	19	—	4	Properties between AZ63A and AZ92A; good pressure tightness, weldability.
AZ92A-T6	9.0	—	—	2.0	—	41	21	—	2	Maximum yield strength in Mg-Al-Zn alloys; pressure tight, weldable.
EZ33A-T5	—	3.3	—	2.7	0.7	23	15	—	3	Excellent pressure tightness, good creep strength at between 350°-500°F.
HK31A-T6	—	—	3.3	—	0.7	33	15	—	8	For short time use at 350°-700°F under high stress; good creep, weldable, pressure tight.
HZ32A-T5	—	—	3.3	2.1	0.7	29	14	—	7	For long time use at lower stresses than HK31A and about 350°-700°F; good creep, pressure tightness.
K1A-F	—	—	—	—	0.6	26	8	—	19	High damping capacity; moderate strength.
ZH62A-T5	—	—	1.8	5.7	0.7	40	26	—	8	Good ductility; yield strength; pressure tightness.
ZK51A-T5	—	—	—	4.6	0.7	40	26	—	8	Good ductility; yield strength.
EXTRUSION ALLOYS										
AZ31B-F	3.0	—	—	1.0	—	38	29	14	15	General purpose, moderate strength; formable, weldable. Stress relief required.
AZ61A-F	6.5	—	—	1.0	—	45	33	19	16	Improved strength over AZ31B. Stress relief required.
AZ80A-T5	8.5	—	—	0.5	—	55	40	35	7	High strength, low ductility, solid shapes only. Stress relief required.
HM31A-T5	—	1.2 min.	3.0	—	—	44	38	27	8	Outstanding high temp, good room-temp properties. No stress relief required.
ZK21A-F	—	—	—	2.3	0.6	42	33	25	10	Properties between AZ31B and ZK60A; good weldability. No stress relief required.
ZK60A-T5	—	—	—	5.5	0.5	53	44	36	11	High strength, good toughness; not arc weldable.
(P)ZK60B-T5	—	—	—	5.8	0.5	49	38	40	17	Pellet extrusion with high compressive yield strength; solid shapes only. Not arc weldable.
SHEET AND PLATE ALLOYS										
AZ31B-H24	3.0	—	—	—	1.0	—	42	32	26	15	General purpose, moderate strength; dent resistant; good formability, weldability. Stress relief required.
-0							37	22	16	21	
HK31A-H24	—	—	—	3.3	—	0.7	38	30	28	9	Good short time properties at 400°-650°F. Good formability, weldability. No stress relief required.
-0							33	20	14	23	
HM21A-T8	—	0.6	—	2.0	—	—	34	25	15	10	Very stable at 400°-750°F. Formable, weldable. No stress relief required.

(1) -F = as fabricated; -H24 = hard rolled, then partially annealed; -0 = fully annealed; -T4 = solution heat treated; -T5 = artificially aged; -T6 = solution heat treated then artificially aged; -T8 = solution heat treated, cold worked, then artificially aged.
(2) ksi = thousand psi.

ness, which can result in weld cracking.

The high zinc content alloys (ZH62A, ZK51A, ZK60A) are not recommended for arc welding because of their high weld cracking tendencies. Interestingly, however, ZK60A can be spot and seam welded with excellent results. Thorium-containing magnesium alloys (HK31A, HM21A, HM31A) possess excellent welding qualities and excellent freedom from cracking. Weldments of these alloys do not require stress relieving.

Welds in magnesium alloys are characteristically fine grained; in arc welds grain size averages .01 inch, and slightly finer in spot welds. (Metallurgy of magnesium welds is detailed in Chapter 70 of the American Welding Society Welding Handbook.)

In common with other metals, certain magnesium alloys are subject to stress corrosion. Over a period of time, this type of corrosive attack may cause cracking around magnesium welds if the residual stresses remaining after welding are not adequately relieved or removed.

Arc Welding Procedure

Getting down to specifics, let's start with arc welding of mag. This process has several advantages: No flux is required; high welding speeds and accurate control of weld bead are obtained; sound welds, free from porosity are produced; the process is efficient, versatile and reliable; distortion and other undesirable heat effects are minimal; little finishing is needed; welds have high strength efficiency.

The process resembles the carbon arc welding of steel, but a tungsten electrode or a continuous magnesium wire electrode is used. An inert gas shields the weld puddle, and is confined to the weld area by a cup around the electrode.

Arc welding may be done manually or by machine. There are four methods available: gas tungsten-arc with a-c and superimposed high frequency current for arc stabilization; GTA with d-c reverse polarity; GTA with d-c straight polarity; Gas metal-arc with d-c, reverse polarity.

- Gas tungsten-arc with a-c and superimposed high frequency current is the most commonly used process for all types of magnesium joints. It requires less joint preparation than d-c, reverse polarity, because the arc has better penetration. A tungsten electrode is used and argon, helium, or a mixture, the shield.
- Direct current, reverse polarity gas tungsten-arc welding offers good control of weld heat when joining thin materials. The arc has shallow penetration but makes a wide weld deposit and leaves a smooth bead. High heat input is required, a large diameter tungsten electrode is used, and argon or helium, used separately or mixed, is the shield.
- Direct current, straight polarity gas tungsten-arc is used primarily in mechanized welding where deep penetration is needed. It is difficult to handle manually; requires exceptionally clean base metal since the arc has no cleaning action. A tungsten electrode is used with a normal shield.

Gas metal-arc welding is performed only with d-c, reverse polarity, power units. It uses a continuously fed, consumable magnesium electrode usually with an argon shield. It is a semi-automatic, high production process that is much faster than gas tungsten-arc work.

In welding thin gauge metal, either a-c or d-c units can provide the power but on material over 3/16-inch thick use a-c machines because they offer better penetration.

Alternating current machines should be equipped with a primary contactor operated by a control switch on the torch or by a foot switch for starting and stopping the arc. Otherwise, arcing while approaching or drawing the electrode away from the work may result in surface "burned spots."

Direct current welding units should have a continuous amperage control for fine current adjustment. A third type of arc welding machine being used on magnesium is a constant voltage d-c unit with electrode positive connection.

Tungsten rods ranging from .010 to .250 inch in diameter are used when gas tungsten-arc welding. Level wound spools of various diameters of round magnesium wire form the electrode in gas metal-arc.

Rods Come in Five Sizes

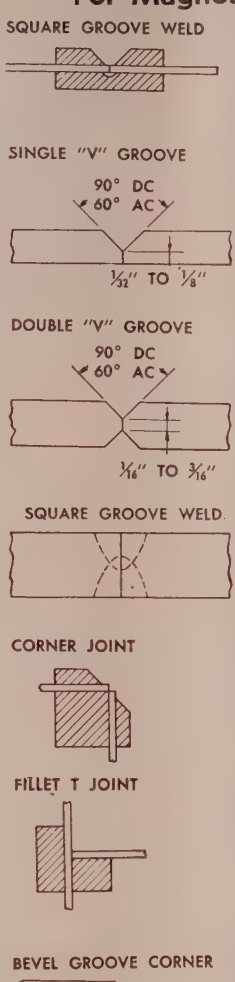
Magnesium welding rods and electrodes come in five diameters: 1/16, 3/32, 1/8, 5/32 and 3/16 inch. Three standard alloys are available: AZ61A (container color code, gray; melting point, 1140°F); AZ92A (color code, orange; melting point, 1110°F); EZ33A (color code, pink; melting point, 1189°F). Other alloys can be requested.

Welding rod AZ92A is preferred for best weldability; AZ61A is satisfactory for most jobs and is less expensive, but is more subject to weld cracking. When welding two alloys for elevated temperature use EZ33A rod is always specified. But when a high-temp alloy is joined to a room-temp alloy, AZ92A or AZ61A rod is used.

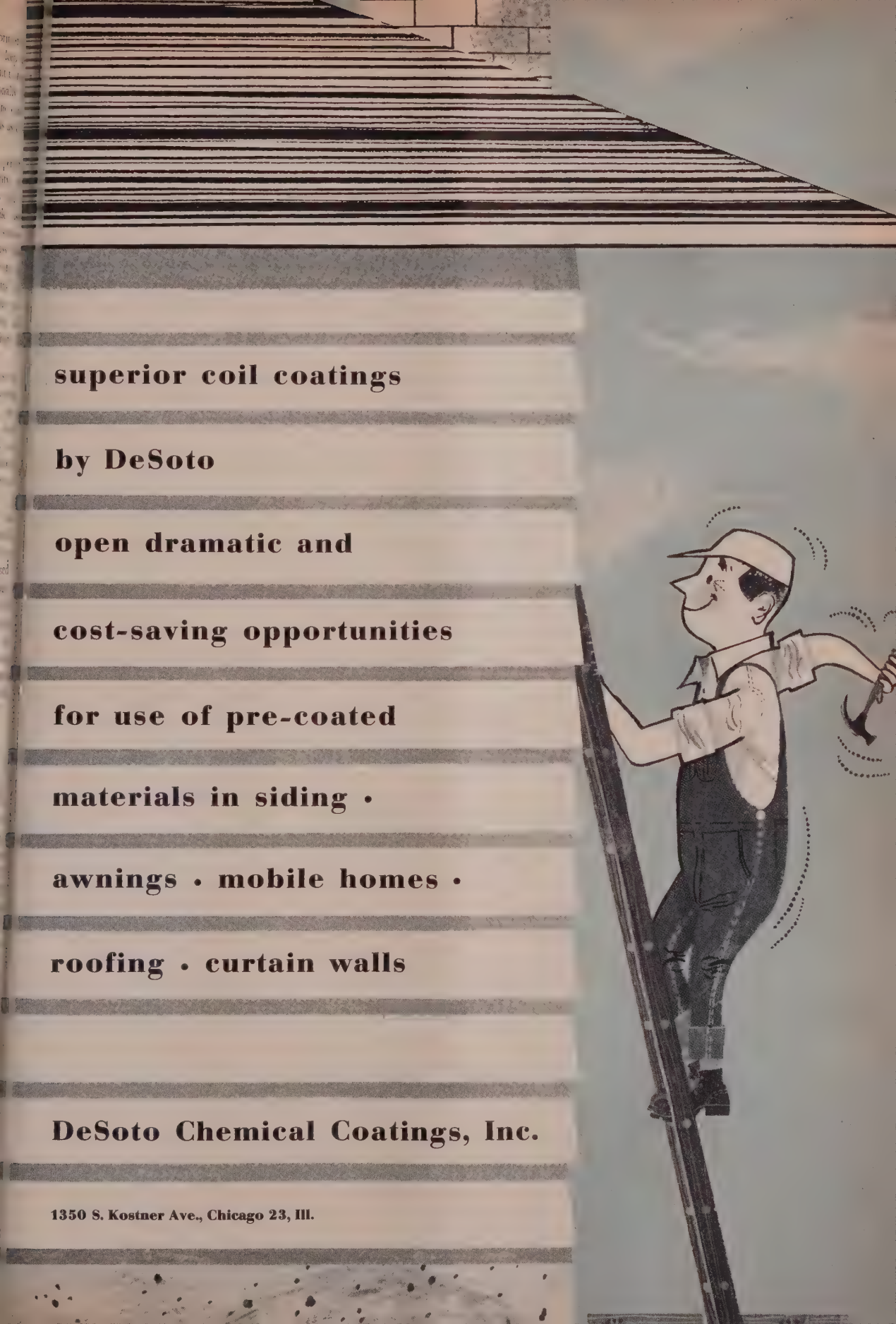
This means that either AZ92A or AZ61A rod is used in almost every instance to join weldable wrought to wrought, wrought to cast or cast to cast alloys to themselves or other alloys.

There are a few exceptions when joining wrought to wrought alloys. Notably when welding HK31A to itself an EZ33A rod is used. This rod is also used for joining HM21A to itself or HK31A

TABLE 3: Arc Welding Joints For Magnesium



*DCRP—direct current, reverse polarity (TIG)
DCSP—direct current, straight polarity (TIG)
AC—alternating current (TIG)
MIG—metal-inert-gas
**Maximum gauge (inches)
†Minimum gauge (inches)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or when joining HM31A to itself or HK31A or HM21A.

The exceptions are more numerous in welding cast to wrought alloys. The EZ33A rod is used when welding EZ33A to HK31A, HM21A or HM31A; HK31A to itself or HM21A and HM31A; HZ-32A or QE22A to HK31A, HM21A or HM31A.

In welding cast to cast alloys EZ33A rod is used when joining this alloy to itself; HK31A to itself or EZ33A; HZ32A to itself or EZ33A or HK31A; KIA to itself; ZE41A to itself; and QE22A to itself or EZ33A, HK31A or HZ32A.

Both helium and argon shielding can be used when welding magnesium. The choice depends largely on price and availability in a given area. Helium is considered more practical than argon for gas tungsten-arc using d-c, reverse polarity. However, you need as much as two to three times more helium than argon for a particular job. Argon is most frequently used with a-c; the gases can be mixed.

In shops where both magnesium and aluminum are welded, argon is preferred. Gas purity should always be the highest obtainable.

No unusual safety precautions need be taken when welding magnesium. The operator should use a helmet, gloves and fire resistant clothing since a local "sunburn" can be acquired if face, hands and arms are left unprotected.

Fire Hazard Remote

Although low melting point and rapid oxidation are characteristic of magnesium, the possibility of fire caused by welding the metal is remote. Partial melting of solid magnesium must occur before it will burn, and burning continues only if the melting temperature is maintained. (For further information on safety procedures get Bulletin 48 — Standards for Magnesium, published by the National Fire Protection Assoc.)

Helium and argon aren't toxic so inhalation of these gases doesn't have to be guarded against. However, because thorium is a radioactive element, its possible toxicity in certain alloys has been investigated. A suggested standard of .1 mg. thorium per cubic meter of air is a safe limit of continuous atmospheric exposure.

The use of local exhausts when welding reduces thorium concentration well below the accepted limits. If the visible welding fumes flow away from the weldor, the ventilation is probably adequate. Check airborne thorium in the weldor's breathing zone.

Magnesium alloys are usually supplied with an oil coating, and acid or chrome pickled surface. These surfaces and edges must be cleaned prior to welding to remove any oxides and dirt. It is also important that the welding rod itself be mechanically or chemically cleaned. Keep welding wire clean; store partially used spools so they don't become dirty.

Mechanical cleaning with steel wool, aluminum oxide abrasive cloth, or power wire brushes is preferred for most jobs. For chemical cleaning use a bath made up of 24 ounces chromic acid, 5½ ounces ferric nitrate, 1/16-ounce potassium fluoride, and enough water to make one gallon.

The solution should be placed in a ceramic or stainless steel tank, or one that is lined with lead, synthetic rubber or a vinyl base material. The bath should be held at a temperature of 70 to 90°F. To clean, dip work in bath for 3 minutes, rinse thoroughly in hot water, and air dry.

Various methods of joint preparation can be used (see Table 3). Less preparation is needed for a-c welding because it has better weld penetration than d-c, reverse polarity.

When Preparing Joints

In joint preparation, edges can be beveled by milling, sawing, routing, sanding or filing. Use sheared edges on thin sheet up to .080 inch; double sheared edges on thicker sheet. Also, use double beveled rather than single beveled joints to minimize distortion.

For fit up, place parts tightly together with a gap of less than 1/16-inch. Start tack welds a short distance from the end of the seam, making 1/16-inch welds spaced 1 or 2 inches on centers in .063 inch sheet to about ¼-inch tacks 4 or 5 inches on centers on .250 plate. Use a soft leather or wood mallet for straightening during and after tacking.

Of the typical arc welded joints shown in Table 3, butt and fillet joints are the easiest to make and provide the most consistent results. Lap welds are sometimes used but generally aren't as satisfactory as butt joints for stresse applications.

The minimum thickness of magn sium for arc welding is about .025 inc there is no known maximum since th thickest plate in commercial use is bein arc welded. The design of a given joi and the operator's skill usually dete mine practical minimum and maximu thicknesses to be arc welded.

Jigging is Important

Jigging is important to welding ma nesium because the metal must be ve rigid to resist movement of parts durin work. Hold down bars must exe enough pressure to keep edges fro climbing over each other, or raisin away from the backing plate. Plat should be made of steel, aluminum magnesium or copper with a sma groove directly under the seam. Th backing plate prevents excessive met "drop down", holds work in place, an minimizes distortion (see Table 4).

Among the preparation techniques a relatively new process for the a cutting of thick magnesium sheets. Bas principal is the same as that employe in tungsten arc welding; both manu and automatic cutting can be done.

Tungsten arc welding equipment, a constricted nozzle and a pilot a circuit are used. The shield is a mi ture of hydrogen and argon (manu cutting, 80% argon, 20% hydrogen; a tomatic cutting, 65% argon, 35% h drogen). Fumes must be exhausted.

Before manually gas tungsten-a welding a magnesium product chec with your welding distributor on suc points as current settings, inert gas flo etc. But to give you an idea of the typ of information needed, assume we are t make a fillet weld on .125 inch AZ31 sheet. We use back-up plates, 100 amp a-c, make one pass using a ⅛-inch diam eter tungsten electrode and ⅛-inc AZ31B welding rod. The argon shiel flows at 18 cfh.

To weld, we hold the electrode a most flush with or slightly below th work surface so as to get maximu weld penetration. We keep average a length at about 3/32 inch. The torc with the electrode is nearly perpen dicular to the work; the welding ro is held nearly parallel to the work.

Welding is done with a weaving o rotary motion. (If we were making an thing but a fillet or large corner join we would weld at a uniform speed i a straight line along the weld seam

We avoid stops as much as possibl If one is necessary, we resume weldin back about ½-inch from the end o the previous weld.

In an effort to prevent weld crackin we use starting and stopping plates. (Bu if these weren't used we would hav

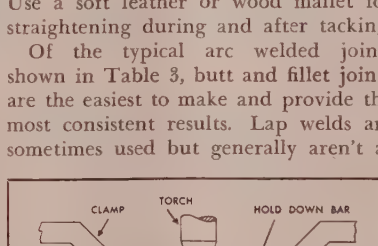

TABLE 4:
Backing Plate Groove Dimensions

Metal Thickness (inches)	Groove Depth (inches)	Groove Width (inches)
Up to .063	1/32	1/8
.063 - .100	1/16	3/16
.100 - .190	3/32	1/4
.190 - .250	1/8	5/16
.250	1/8	3/8
.375	5/32	1/2
.500	5/32	3/4

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started our weld in the middle of the work and welded back to each edge. Maybe we would have also preheated our work and jig to 200 to 400°F. If cracks still appeared, we would have increased our welding speed.)

When manually gas tungsten-arc welding unequal pieces, where the thickness difference is ¼ inch or more, pre-heat the heavier section with a gas torch to about 350°F. In welding equal pieces, or metal over ⅜ inch, use multiple beads.

Butt the beveled edges together and run a small bead at the base of the included angle or V-groove, wire brush, then fill the angle with additional passes. Use a flat or concave bead since convex beads can cause incomplete fusion and inclusion between passes.

Machine Welding Magnesium

Machine welding of magnesium is similar to manual welding except that higher currents and faster speeds are used. Currents needed will range from 55 amps for joining .040-inch sheet to 350 amps for welding .250-inch plate in making a butt weld using backing plates and hold down bars.

Tungsten electrode diameter will vary according to metal thickness and type of current. For example, in a-c welding .040 sheet, a 1/16-inch electrode is used; for d-c, reverse polarity, a 3/16 electrode is needed; for d-c, straight polarity, a .040 electrode is required. In welding .080 sheet, electrode diameters would be 3/32 for a-c, ¼ for dcrp, 1/16 for dcsp. But in welding both gauges a rod of 3/32 inch diameter is used.

Proper and constant alignment of electrode and welding rod is important in machine welding. Feed the rod into the arc at a low angle to the work so that the rod touches the weld surface just ahead of the electrode. Use an automatic arc voltage control setting of about 18 volts in d-c welding with helium shielding. The arc length should be preset if argon is the shield, whether an a-c or d-c machine is used.

Speeds up to 80 ipm can be reached on thin gauge magnesium sheet, but normal speeds are from 6 to 20 ipm.

Gas tungsten-arc spot welding, used primarily on AZ31B sheet, utilizes conventional equipment with a timing device to control arc duration. Spot welds can be made when only one side of an assembly is accessible, or on parts too large to fit between the electrodes of a resistance welding machine.

The arc is initiated by superimposing a high frequency current on the welding current, or by maintaining a pilot arc between the cup and the electrode when no weld is being made. No welding rod is required and spot size is determined solely by weld current and arc time. Good fit-up is essential for sound welds.

Gas metal arc welding utilizes an automatically fed, consumable magnesium wire electrode, high current densities (d-c, reverse polarity), and an argon shield. There are three distinct types of metal transfer arc: Low current density short arc; high current density spray; and globular which is hard to control, cuts speeds and weld penetration.

Gas metal arc is 3 to 5 times faster than gas tungsten-arc with speeds ranging from 24 to 60 ipm, and occasionally higher. This semi-automatic process is suitable for large scale repetitious welding; doesn't require as much skill as gas tungsten-arc; produces welds equal to those of gas tungsten-arc in strength.

Spools of either AZ61A, AZ92A or EZ33A welding wire can be used along with d-c, reverse polarity power units, preferably of the constant voltage type. Argon provides the best shield, though mixtures of argon and helium are used. However, straight helium is a poor shield since it causes metal spatter and turbulence.

Main disadvantages of gas metal arc are that its high metal deposition rate limits use to flat, horizontal and vertical down position welding. The process lacks flexibility, so it actually supplements rather than replaces gas tungsten-arc welding.

The gas metal arc is struck between the bare magnesium wire electrode and the work. Some equipment requires a scratching movement or point contact with the work to initiate the arc, while others start automatically. Vital to welding operation is that the wire sp be kept clean.

Use a spray transfer arc, which duces a heavy weld bead, when join magnesium thicker than 3/16-inch. short arc transfer for thinner she

Warpage of arc welded joints can minimized by using jigs, or tack interrupted welding techniques. If w age does occur, it can be eliminated heating parts to the recommended st relief temperature (see Table 5) then pressing or hammering lightly shape with a leather or wood malle

If parts were welded in a jig, t can be jigged again and heated to proper temperature. If the time la shown in Table 5 are maintai residual stresses in the welds are relieved. Use magnesium annealing to prevent differential expansion wh occurs with jigs of other metals.

Welded magnesium parts are st relieved to prevent stress corros cracking, to obtain a stress free assem and to size and straighten parts.

The magnesium-aluminum-zinc al are susceptible to stress corrosion cr ing. Other alloys containing mangan rare earths, thorium, zinc or zirconi are not stress corrosion sensitive. T may be stress relieved however, to mit the holding of close machin tolerances, or for straightening.

The stress relief schedules in Ta 5 reduce stresses about 80 to 95% all alloys except HM21A-T8 HM31A-T5 in which the stresses decreased about 50%. The stress re treatments listed for castings used only to reduce residual stres To develop maximum welded jo strength, castings must be given weld heat treatment (discussed later

To Stress Relieve . . .

To stress relieve, the part is pla in a jig or clamping plate and hea for the specified time, then cooled air free from excessive drafts. Jigs used to prevent warping.

Post-weld cleaning of an arc wel assembly is simplified because no is used during welding. Welds need only careful wire brushing or chemical cleaning method already scribed. Arc weld "smoke" can be moved by immersing the parts for to 2 minutes in a 180 to 212°F solut of 16 ounces tetrasodium pyrophosph 12 ounces sodium metaborate plus wa to make one gallon.

Parts are then ready for chem treatment prior to painting. Excess b can be removed by routing, grindi filing etc.

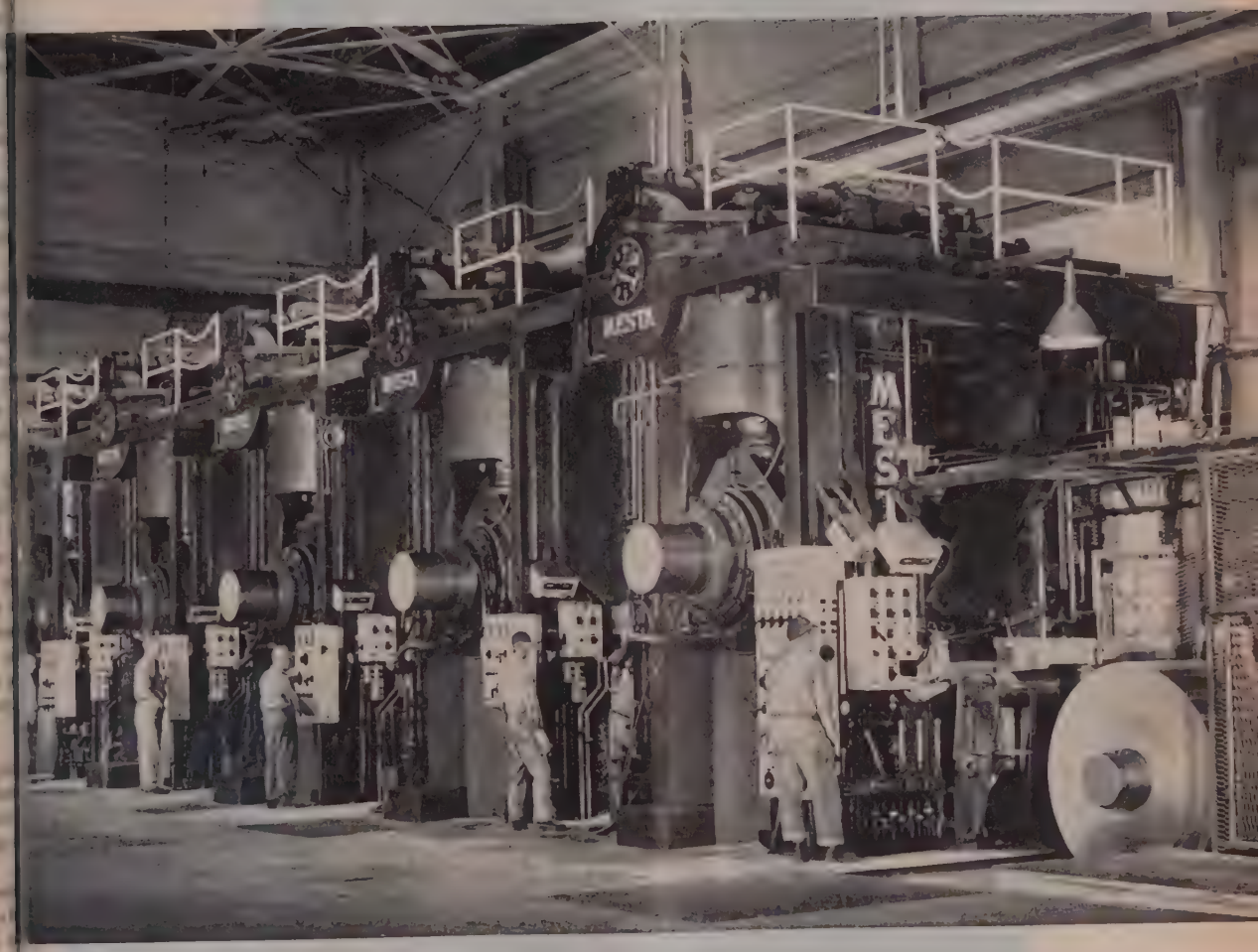
Are welds should be inspected undercutting, cracks, porosity, overl ping, craters, inclusions and similar

TABLE 5: Stress Relieving Arc Welded Magnesium

Alloy	Time	Temp.
Sheet		
AZ31B-O(1)	15 Min.	500°F
AZ31B-H24(1)	60	300
HK31A-H24(2)	30	550
HM21A-T8(2)(3)	30	700
Extrusions		
AZ31B-F(1)	15 Min.	500
AZ61A-F(1)	15	500
AZ80A-T5(1)	60	400
HM31A-T5(2)(3)	30	500
Castings		
AZ63A(1)	1 hr.	500
AZ31A(1)	1	500
AZ91C(1)	1	500
AZ92A(1)	1	500
EZ33A(2)	2	650
	plus	
	5	420
HK31A(2)	16	400

(1) Required to prevent stress corrosion cracking
(2) To obtain stress free assembly
(3) 80-95% stress relief obtained in all alloys except HM21A-T8 and HM31A-T5 where about 50% stress relief is obtained.

MESTA Cold Mills



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fects. Standard methods include visual inspection, radiography and the fluorescent oil penetrant method.

• Crater cracks can be caused by improper manipulation of torch and welding rod or by using the wrong welding rod alloy. To correct: Break arc slowly while continuing to add rod; use runout tabs; decrease current at end of weld while adding rod; use recommended alloy.

• Longitudinal cracks are caused by wrong welding rod alloy, improper joint spacing or edge preparation, low weld current, overstressing the weld. To correct: Use recommended rod; proper joint design and preparation; adequate current; preheat to 200 to 400°F; increase weld size or section thickness; place weld in compression; use a more ductile alloy.

• Underbead cracks are most common in automatic welds and are caused by arc travel being too fast, wrong joint type, fillet size or parent alloy. To correct: Reduce arc travel speed for better control and penetration; use proper joint design.

• Incomplete fusion results from improper joint preparation, dirty joints, or from using inadequate welding current. To correct: Be sure to have properly designed clean joints; weld with adequate current.

• Undercutting is caused by improper torch or rod manipulation, high welding current, fast welding speed. To correct: Practice welding to replace melted parent metal with rod metal; use proper current requirements; decrease speed.

• Porosity comes from using dirty welding wire or working on dirty parent metal, using wrong arc length and technique, or having an inadequate shield. To correct: Clean materials thoroughly; use recommended arc length; hold close arc; use enough gas to obtain good shield.

• Incomplete penetration is a problem resulting from using a low welding current, wrong joint spacing, improper edge preparation, or a long arc. To correct: Boost current; check joint design and edge preparation; shorten arc.

Gas tungsten-arc welding is preferred for joining magnesium sand and permanent mold castings. It is used to repair broken pieces so a casting can be used again (provided the break isn't in a highly stressed area and that government specifications permit such repair in a given use). Gas tungsten-arc is also used to join castings to wrought metal.

Before welding, the alloy composition, heat treatment, section size and complexity must be considered as well as the location of welds with respect to expansion and contraction. If the ca ing alloy isn't known a chemical spectrographic analysis of compositio must be made. Original heat treat co dition must also be known since affects both pre- and post-weld heatin and reheat-treating.

To repair a broken casting strip paint and remove pickle treatments the broken edges with steel wool power wire brush. Then clamp brok pieces in place and bevel the fractu as in preparing wrought alloys for wel ing (see Table 3). Next, preheat t castings using either a torch or a f nace; no special atmosphere is needed.

Use these preheat temperatures:

ALLOY	HEAVY OR UNRESTRAINED SECTIONS	THIN OR RESTRAINI SECTION
AZ63A	Local or none	650-720
AZ81A	Local or none	650-750
AZ91C	Local or none	650-750
AZ92A	Local or none	650-750
EZ33A	None-500°F	500° (1½ h max.)
HK31A	None-500°F	None-500
HZ32A	None-500°F	None-500
K1A	None	None

In handling alloy AZ63A preheat a rate not exceeding 150°F/hour fr 500°F to treating temperature if casti is in -F (as fabricated) temper.

Weld immediately after preheati and reheat when casting temperat drops to about 650°F. Use medium s beads. Weld broken pieces from center of the break to the outside ed Don't let the arc dwell too long in c area as this may cause cracking. Us foot control to fade out the arc gr ually to avoid thermal shock when arc stops. Such shocks cause cracki

Repaired castings are generally h treated again after welding (see Ta 6). The heat treatments shown depe upon temper prior to and after weldi Only the minimum heat treating ti (½ hour) for complete solution is u for welded AZ81A, AZ91C and AZ9 castings. If complete solution heat tr ment isn't wanted, welded casti are always stress relieved (see Table

Welding castings to wrought m requires similar procedures and weld rods. Taper edges of heavy c ing sections to thickness of sheet extrusion (see Table 3); preheat c ing if desired, though it isn't requir during welding direct the heat pri pally upon the casting.

For maximum properties, weld casting in the heat treated state fin desired because cast and wrought s semblies cannot be solution heat trea without loss of wrought metal pro ties. If a stress-free assembly is des stress relieve the part according to T 5. Use the lowest temperature rec mended for stress relieving of the different components.

TABLE 6: Heat Treating Welded Mg Castings

Alloy	Welding Rod	Temper Before Welding	Desired Temper After Welding	Heat Treatment After Welding (times after reaching temperature)
AZ63A	AZ92A[1]	–F[2]	–T4	12 hrs. at 725±5°F
		–F[2]	–T6	12 hrs. at 725±5°F +5 hrs. at 425°F
		–T4	–T4	1/2 hr. at 725±5°F
		–T4 or –T6	–T6	1/2 hr. at 725±5°F +5 hrs. at 425°F
AZ81A	AZ92A	–T4	–T4	1/2 hr. at 775±5°F (SO_2 atmosphere)
AZ91C	AZ92A	–T4	–T4	1/2 hr. at 775±5°F (SO_2 atmosphere)
		–T4 or –T6	–T6	1/2 hr. at 775±5°F (SO_2 atmosphere) +4 hrs. at 420°F or 16 hrs. at 335°F
AZ92A	AZ92A	–T4	–T4	1/2 hr. at 765±5°F (SO_2 atmosphere)
		–T4 or –T6	–T6	1/2 hr. at 765±5°F (SO_2 atmosphere) +4 hrs. at 500°F or 5 hrs. at 425°
EZ33A	EZ33A	–T5	–T5	2 hrs. at 650°F+5 hrs. at 420°F or 5 hrs. at 425°F.
HK31A	EZ33A	–T6	–T6	16 hrs. at 400°F
HZ32A	EZ33A	–T5	–T5	16 hrs. at 600°F
K1A	EZ33A	–F	–F	None

[1] AZ63A rod used if specification requires.
[2] Preheat at rate not exceeding 150°F/hr. from 500°F to heat treat temperature. AZ63A rod must be used with -F temper because 12 hrs. at 725°F causes germination in AZ92A welds.

SALES LEAD BULLETIN

DEFENSE MARKETING SERVICE * KAISER ALUMINUM

April 21, 1961

The following government agencies have issued i

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1. APPROXIMATELY 20 PERSHING TRANSPORTER ERE(MISSILE AGENCY, Redstone Aresnal, Alabama specifications on this requirement for la weight structure design for the pershing Cleveland. Design is to aircraft standa Interested bidders should contact their Only thirty days will be allowed for pre tion is issued, so a preview of the pri

2. 1171 ALUMINUM FLOODLIGHTS --- Issued by Chicago Corps of Engineers, 226 W. Jacl 61-AF-448-JDB opening May 2, 1961 ---

3. 1500 PAIRS ALUMINUM CRUTCHES --- Issue Illinois --- Bid No. M-3-39 opening M wooden arm and hand pieces, adjust.

4. 570 MOUNTING PLATES FOR SAFETY AND AI (T45E1) WARHEADS --- Issued by ORDNAI IFB-ORD-11-173-61-18B -- opening May processing, drilling and wiring. De Iowa --- Requests for invitations f 1961. Bids will not be mailed to f Small Business Only.

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Duratile of Texas, Inc., Tyler, Texas, knew that applying paint to a converted surface was the most desirable method of enameling aluminum. So the firm bought coil stock that came from the mill with a form of chromate coating already applied—at a cost of five cents per pound extra.

Business flourished and volume of coil stock consumed mounted. In an effort to cut costs, Duratile investigated the possibilities of installing its own pretreatment line so that the company could buy and do the conversion coating itself.

When Duratile discovered that such a line was feasible, it called in a representative of Oakite Products Inc., New York 6, to recommend cleaning and coating solutions and methods. Then the necessary equipment was installed.

Now, the pretreatment line is the first stage in the three-step fabricating process Duratile follows in making its wall tiles.

Pretreatment itself consists of five steps. First, 13-5/8-inch wide coiled sheet is cleaned with a spray type detergent for 31 seconds. The detergent, Oakite 161, is applied at 160°F. Two ounces of the cleaner are mixed with each gallon of water needed. Cleaning is followed by stage two—a 15 second cold water rinse.

Next, the metal is conversion coated using Oakite ChromiCoat (2½ ounces per gallon of water), which is said to provide a firm grip for paint and to protect against under-finish corrosion. The solution is heated to 100°F and is sprayed on the metal for 31 seconds. The metal is again given a 15 second cold water rinse (stage four) and finally is dried for 22 seconds (stage five).

After leaving the coating line the coil passes to a Duratile-designed slitter which makes two coils—one 4½ inches wide, another 9⅛ inches wide.

Next, Tiles are Stamped

The two coils are then moved to the stamping department where tiles are made. The 4½ inch coil is run through a press using a single die operating at 135 strokes a minute; the wider coil passes through a double-die press which runs at 120 strokes a minute. Both presses, supplied by Rockford Iron Works, Chicago, are equipped with cradles, seven-roll straighteners and automatic feed units.

After the tile is blanked it is pushed through the press bolster and stacked automatically. The stacks of tiles are then loaded on trucks and taken to the painting department.

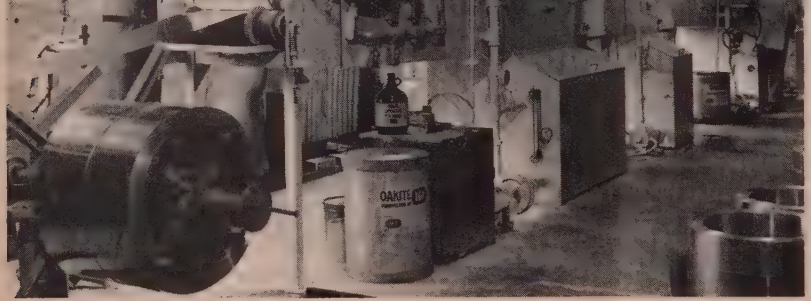
By the time the tiles have reached the finishing department the metal has gone through many fabricating operations — slitting, straightening, stamping —but the conversion coating remains in perfect condition, reports Duratile.

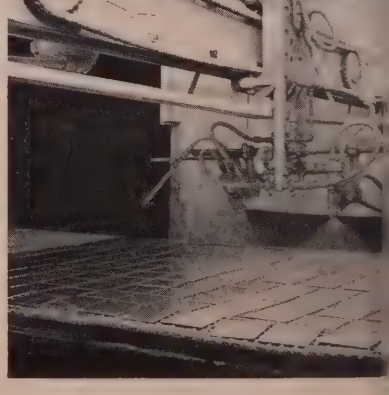
In the finishing department tiles are placed by hand on a 60-inch wide, 110 foot long wire belt conveyor which normally travels at a rate of 5½ fpm. The conveyor moves the tiles to a spray booth where two 72-inch reciprocating spray guns, supplied by DeVilbiss Co. Toledo 1, apply a 2 mil coating of paint.

Paint used is a modified alkyd, made to Duratile specifications by Jones-Blair Dallas, Texas. The paint is thinned with toluol and xylol to 32 seconds on a Zahn No. 2 cup. The tips of the guns applying the material are FX air caps are No. 78; normal spraying pressure is 30 pounds.

From the spray booth the conveyor leads the tiles to a flash-off tunnel and then into a gas fired, infrared oven made by Burdett Mfg. Co., Chicago 38. The two-zone, 56-foot unit bakes tile at 300°F for 10 minutes, after which the tiles pass through a forced air cooling tunnel and are finally inspected and packaged.

This three-step manufacturing procedure — conversion coating, stamping finishing—produces 80,000 tiles during a 7½ hour day. Duratile reports that even with this high production rate there are no paint failures.





■ *Duratile's conversion coating line, above, has five stages (left to right): Cleaning, rinsing, conversion coating, rinsing, drying. Dried coil is slit to two strips, stamped and finished. At right, 72-inch reciprocating spray gun applies 2 mil thickness of enamel to tiles prior to their entering baking oven.*

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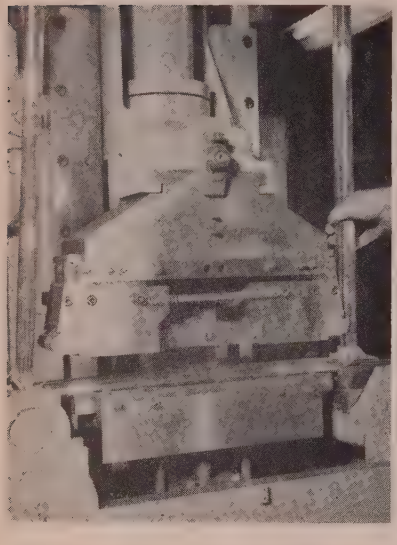
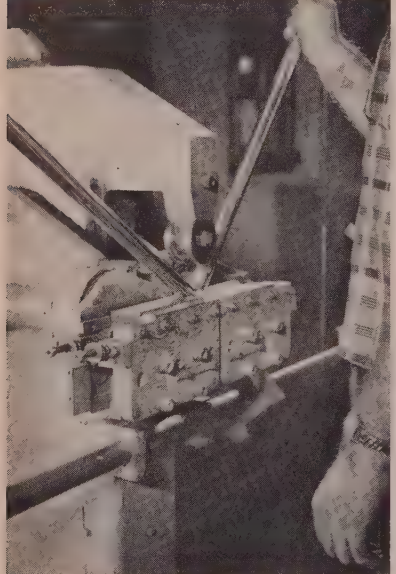
HYDRAULIC BENDING PRESSES ... *speed furniture production*

by John Geyer, Plant Manager, Kalamazoo Sled Co., Kalamazoo, Mich.





■ *Two tube bending operations at Kalamazoo Sled Co. At top, a 6-ton Pines press forms two 90° bends each in two parts simultaneously. Production rate is 1600 bends an hour — a 250% increase over previous method. At bottom: Progressive bending (one bend at a time) on a 3-T Pines press produces over 600 chair leg frames an hour — a 33% increase over former method. Switch to machine bending also slashed scrap rate 75% at Kalamazoo Sled Co.*

MORE than one hundred different tubular aluminum parts are formed and used in the production of the line of summer and casual furniture made by Kalamazoo Sled Co., Kalamazoo, Mich.

These parts, varying widely in size and configuration, are formed from cut-to-length pieces of 1-inch and ⅞-inch welded aluminum tube (alloy 3003), with wall thicknesses of .032 and .035-inch.

Formerly produced on conventional bending equipment, many of these parts are now formed on two new hydraulic bending presses built by Pines Engineering Co., Inc., Aurora, Ill. One machine produces progressive bends, one at a time; the other is designed for multiple bending.

The switch to press bending has yielded noteworthy gains in production rates — in some cases up to 250% over the previous rates with conventional bending machines. Scrap rate has been trimmed better than 75% to the point where it is now less than 1% of a given production run.

An outstanding example of the increase in production is the "U" shaped rear leg frames for chairs. These are now formed two parts at a time with two 90° bends in each part at the rate of 1600 bends an hour (see photo). The former rate was 450 bends an hour. This represents an increase of over 250%. The machine handling this work is a 6-ton press built by Pines Engineering Co., Inc.

Comparable production increases have been obtained on many other "U" shaped parts that are now formed on the 6-T press. All of these parts are formed with two 90° crush bends.

Collapse Dies Ease Removal

For fast, easy removal of the bent parts, a collapse type bending die is used. Then dies are spread by a cam to the proper distances between bends, retracting rapidly at the end of the bending stroke. Three sets of dies, each with several interchangeable spreader cams, accommodate frames varying from 17¼ to 26 inches between leg centerlines.

Accommodating a broader variety of part shapes, the smaller 3-T Pines bending press is used to produce many parts by progressively bending a single w piece, one bend at a time. Here, substantial increases in production have been realized.

Example: Chair rear leg fra formed from 1-inch O. D. x .032- wall aluminum tube, were formerly duced at the rate of 450 bends hour. They are now formed at the of 600 bends an hour—a productio crease of about 33%.

Jobs are run in small lots to m mize both the quantity of materia process and the storage space occup considering the multitude of diffe component parts. Tubes come to bending operation, cut to length an bundles of 637 tubes each.

Die Change: 5-10 Minutes

On the multiple bending 6-T p stop gauges are set up for a new in less than 5 minutes. A comp change of tooling takes from 30 to minutes. Within 10 minutes the press can be converted for a new when stops only are changed . . . c plete change of both stops and b ing dies in 15 minutes.

Such fast set-ups contribute to practicability of small-lot productio

Crush-type bends produced by p bending are attractive and have g strength and rigidity for furniture plications. The good quality of c bends is largely attributed to the f tion of the twin wing dies which m with the work as the bend progre and wrap the part around the ram eliminating scratches and draw ma

Significantly, the scrap rate has b reduced by more than 75% to less t 1% for any production run. This scrap rate can be attributed to us machines designed specially for benc and by carefully selecting the sou and type of aluminum tubing used.

Savings resulting from increased put and reduced scrap are import in measuring the return on the inv ment in equipment. However, the satility of the bending presses, per ting high production handling of m different parts, has provided even gr er benefits by making it practical produce furniture components in sh run lots without disrupting volume p duction of finished products.

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MECHANIZED HEAT TREATING

speeds sheet output, controls quality at Mirro

Furnace equipment at new aluminum rolling mill designed to minimize handling; hold temperatures to close tolerances.

by M. E. Hutchins, Chief Metallurgist, Mirro Aluminum Co., Manitowoc, Wis.

WHEN Mirro Aluminum Co. placed its new rolling mill in operation in December, 1959, it also unveiled one of the most up-to-date fabricating facilities in the aluminum industry.

The Manitowoc, Wis. firm, world's largest manufacturer of aluminum cooking utensils, has diversified its product mix to include electric housewares, toys, giftware, snow tools, foil, building products and pleasure boats. The company also handles subcontract work on items for the armed forces, transportation equipment, and many other industries.

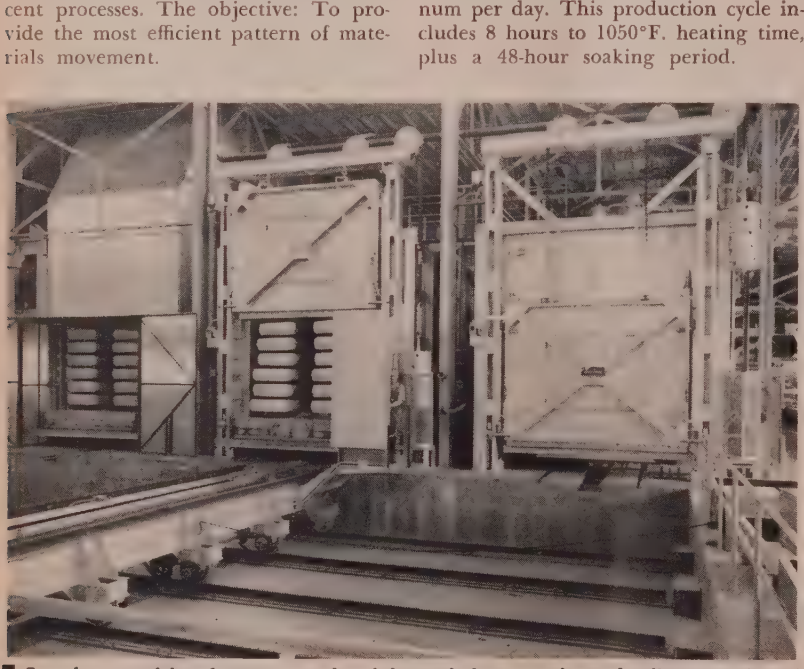
Through the years, Mirro has kept pace with advanced heat treating practices to insure maximum control of product quality. In planning the new mill, equal in area to three city blocks, much consideration was given to integration of furnace equipment with adjacent processes. The objective: To provide the most efficient pattern of materials movement.

As ingots come from the casting station, their structure and the dispersion of the alloying material may not be entirely uniform. To prepare ingots for hot breakdown rolling the ingot structure must be homogenized.

Ingots are homogenized in two direct fired car bottom power convection furnaces, built by Surface Combustion. The internal heating dimensions of each furnace are 38 feet 6 inches long, 13 feet wide and 6 feet 9 inches high. Each furnace has a loading capacity of 220,000 pounds.

Ingots are loaded in two rows, lengthwise to the furnace car, and stacked with spacers between each ingot. A space of twelve inches is provided between the two rows.

Each of the furnaces can be charged with 36 ingots, six stacks of six high. Thus, each furnace is capable of homogenizing 87,000 net pounds of aluminum per day. This production cycle includes 8 hours to 1050°F. heating time, plus a 48-hour soaking period.



■ *Two homogenizing furnaces at the right each have an ingot loading capacity of 220,000 pounds. Heating cycles include 8 hours to 1050°F., plus 48 hours soaking time. Unit at left is a cooling chamber. Transfer car (shuttle mechanism) is used to transport loaded cars from furnaces to cooling chamber and loading and unloading station.*

Furnace cars move in and out of th furnace on eight forged wheels. Thes works cars are lined with insulatin block, backed with an insulating bla ket, and covered with aluminized ste on the top and sides. A transfer ca (shuttle mechanism), traveling on rai parallel to the furnace doors, is used t transfer the furnace work cars betwee the loading-unloading station, the tw furnaces, and a cooling chamber.

Mechanized Loading, Unloading

Movement of the furnace work ca in and out of the furnace and on an off the transfer car is handled by aut matic controls mounted in a pulp attached to the transfer car. From th pulpit the operator, using push bu tons, governs the movement of wor cars.

The transfer car is powered by motor driven worm gear reducing un with an endless roller chain drive Furnace cars are extracted onto th transfer car by a motor powered chai mechanism.

Each homogenizing furnace has thre individual heating zones. Each zon contains an individual power conve tion fan which recirculates air heate by sets of high capacity gas burner Wind temperature in each zone is r corded and controlled by a Minneapoli Honeywell two-position round cha controller.

Ingots are reheated to breakdow rolling temperature (900-975°F) in tw Surface Combustion pusher type, dire fired furnaces, each having a capaci to reheat 120 ingots with a maximu load of 120,00 lbs. per furnace. On batch basis, the heating is accomplishe from cold to 925°F., with less tha 5°F. total variation in an eight-hou cycle, or in five hours with continuo operation.

Each furnace is divided into thr separate zones, and each zone contai an individual power convection fa which recirculates air heated by sets high capacity gas burners that are al installed at each zone. Fuel capaciti

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"YOUNGSTOWN" expansion plans in the fields of Hydraulic Extrusion Presses are emphasized by appointment of four outstanding men in the industry. Fred Kamena, well known for his creative accomplishments, is now Chief Design Engineer, Hydraulic Press Division. Stanley T. Bowden in Youngstown, and Joseph Mein in Montreal, Canada, will direct international sales throughout the world. James Grindlay, who has installed presses in many overseas countries as well as in North America, is Supervisor of Installation and Service. These men have worked together for years and comprise an experienced team of extrusion engineers second to none.

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■ *Discharge ends of reheat-for-rolling furnaces. Billet being extracted from furnace will be delivered to the hot mill in the area at extreme left.*

in all three zones are sufficient to afford fast load heat-up on a batch type operation.

Temperature Variation Slight

Uniformity of temperature from ingot to ingot varies only slightly, within a controlled tolerance. Complete temperature uniformity is maintained within the individual ingots.

Aluminum ingots are conveyed through the furnaces on roller shoes fabricated of heavy structural steel plates. The shoes are supported on 4½-inch diameter cast chromium nickel wheels, which travel through the furnace on steel rails. Fabricated steel stools, anchored to the bottom steel structure, support the rails. The loaded shoes are pushed through the furnace by a hydraulic, gravity dog pusher mechanism.

Ingots are placed on the shoes in an inclined vertical position, and are advanced through the furnace, shoe against shoe. Work is automatically removed from the furnace at the discharge end of the furnace by hydraulically operated pullout bars with gravity dogs. The pullout bar engages the loaded shoe, moving it from within the furnace chamber, and positioning it outside the discharge door.

Empty shoes are returned to the charge end in an inverted position on rails which are continued under the furnace. As shoes are discharged, they are automatically locked into a platform which rotates 180° to a position that lines up with the bottom set of rails.

An endless chain conveyor pushes the shoes to the charge end where a similar platform rotates 180° and raises the shoes to a greasing and inspection station, which is a part of the rail structure at the charge end of the furnace. All operations are automatic and synchronized by a time cycle.

Furnace casing plates are steel; bottom plates are reinforced by structural steel members. The floor of the furnace is of cast insulating refractory, covered with aluminized steel sheets. The walls, roof and doors of the furnace have a modular metal inner lining, designed to prevent wind channeling into and through the insulation, which is an insulating block, backed with a blanket of insulation.

The hot mill operator, using automatic controls, causes ingots to be discharged from one of the two reheat furnaces and delivered to the hot m table.

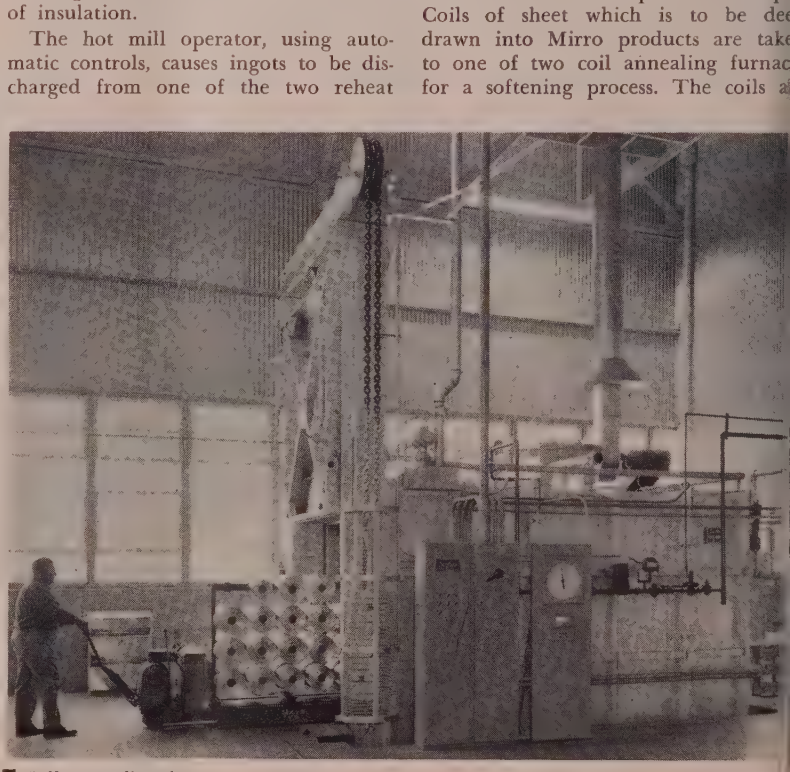
The hot mill is a two-high reversi unit. An ingot on the hot mill table passed back and forth, reversing dir tion through the rolls until the 10-in thick ingot metal is reduced to a 3/ inch slab. Table drives are synchroniz to reverse when the hot mill rolls verse. The table on one side of the m is 250 feet long and is extended 3 feet on the other side of the mill.

At the end of this longer runo table are the shearing, trimming a coiling equipment. It takes appro mately four minutes to roll a 10-in thick ingot to 3/16-inch slab.

After hot rolling reduction, aluminu sheet is taken to a cold rolling mill f further reduction. In this operation o or more of the following objectives attained: Increase in strength and har ness; refinement of grain structu reduction to specified thickness; a control of characteristics of metal flo during subsequent forming operatio Cold rolling is done on a 60 inch, 4-hi cold mill. Thickness of the metal c be reduced 50% on each pass.

High Speed Slitting

Upon completion of rolling oper tions, coiled aluminum sheet goes to t slitting operation and is cut to siz suitable for presses and machines the Mirro fabricating plants. These m chines slit coils at a speed of 500 fp Coils of sheet which is to be dee drawn into Mirro products are take to one of two coil annealing furnac for a softening process. The coils a



■ *Foil annealing furnace at Mirro. Loading pattern permits a gross load capacity 15,000 pounds. DX gas generator provides atmosphere which blankets foil in furna protecting it from oxidizing.*

d between 450 and 900°F., depend-
pon alloy and temper required.
lls to be used for foil production
ent to the 4-high foil mill for
er reduction down to a foil thick-
of .0007". The foil mill is enclosed
special room which is pressurized
blower system, admitting only
d air. This enclosed area is neces-
to keep the foil mill free of dust
might contaminate the metal and
pin holes in the finished foil prod-

e foil mill is similar to the cold
g mill, and operates at an average
of 800 fpm on early passes. On
passes, mill speed may be increased
200 fpm. During the foil rolling
tion, coolant oil is continually
ed over the rolls to remove heat
is generated.

ealing's Triple Treatment

iled aluminum foil is taken from
oil mill to a Surface Combustion
annealing furnace. Annealing sof-
the foil, drives out rolling oils, and
izes the product for household ap-
tions.

ie annealing furnace has inside
ng dimensions 7 feet wide, 7 feet
and 11 feet long. The furnace door
an opening clearance of 7 feet
gh which work cars, loaded hori-
lly with coils of foil are charged
also discharged.

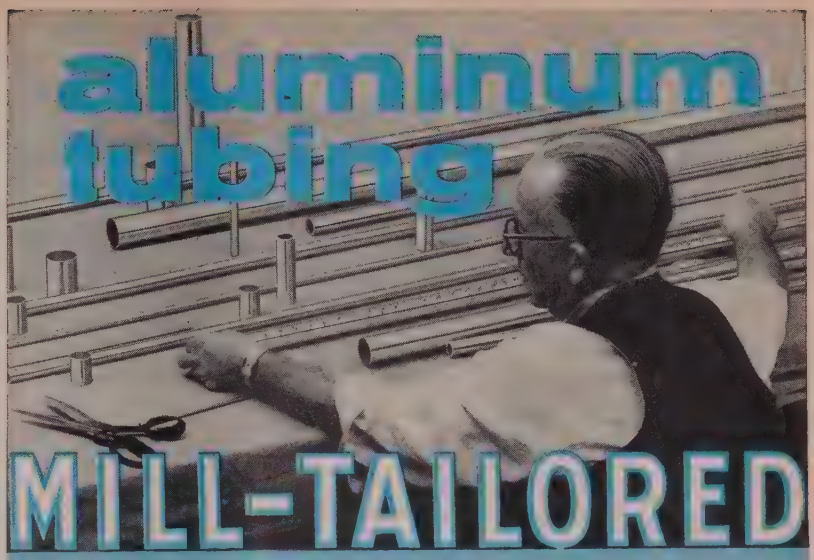
ork cars are specially equipped
arbor fixtures so the coils can be
ted on them horizontally without
ing coil against coil. The loading
rn permits a gross load capacity
5,000 pounds.

ie furnace heats the load to 650°F.
½ hours, including a 2½ hour purge
0°F., using an exothermic gas gen-
d by a Surface Combustion DX
rator. The work is cooled from
F. to 200°F. in approximately the
time required for heating. Coils
then discharged and allowed to
to room temperature.

ie two homogenizing furnaces, the
reheat furnaces, the foil annealing
ace and the DX gas generator were
gned and built by Surface Combus-
Division, Midland-Ross Corp., To-
, Ohio.

carefully specifying the new auto-
c furnace equipment, the company
been able to increase production,
erve floor space, exert maximum
ity control, and trim unit costs.

irro Aluminum's new $12 million
ng mill, the only fully integrated
t of this type in Wisconsin, repre-
Phase One in Mirro's growth pat-
for producing a variety of new
lucts, aimed at creating higher units
ale, new outlets, and far greater
s on supplying volume component
s for other industries.



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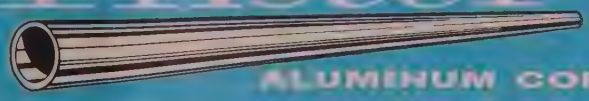

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FLASH WELDING ALUMINUM CURTAIN WALLS

Assembly problems on standard and special curtain wal were solved when Cupples switched to resistance weld with synchronized flashing and upset. Four sets of di were used to weld 3000 wall frames and 9000 sash for th United States Air Force Academy project pictured abov

SWIFT and secure resistance welding of a wide variety of extruded aluminum shapes has helped the Cupples Products Division of Alcoa reduce assembly costs, enhance product quality, and speed production of curtain wall products.

Cupples specializes in designing and fabricating complete curtain wall systems for big architectural projects such as the Humble Oil Building in Houston, Texas, the United States Air Force Academy in Colorado, and the Minnesota Mining & Manufacturing Building in St. Paul, Minn. But this specialization has not prevented the company from retaining its share of the standard curtain wall market.

When Cupples was first founded, the bulk of the market was for relatively light commercial window sash and frames. Corners were square, the joints being secured by splines and screws or tenons and rivets. But as Cupples pushed its penetration of the fast-growing curtain wall market, heavier shapes were employed. Competitive pressures spurred a search for designs and production methods that would give Cupples a competitive advantage.

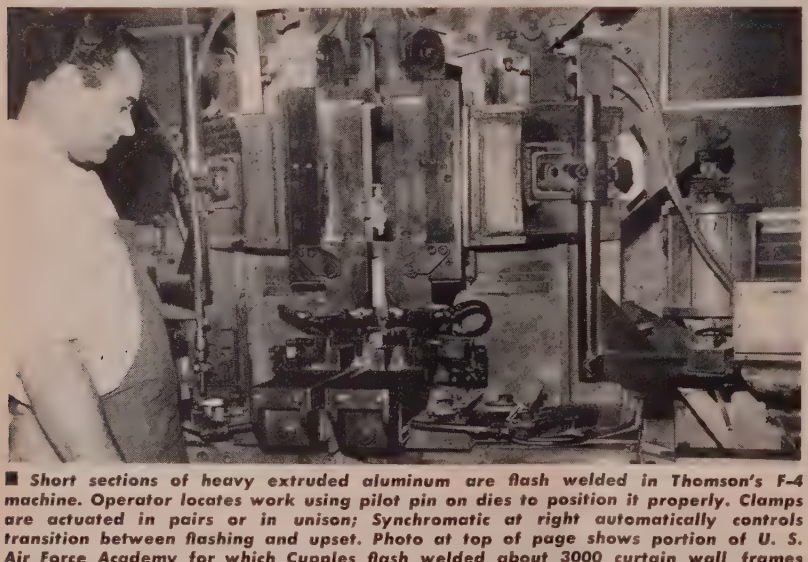
Mitered Corners Best

All methods analyses invariably pointed up the wisdom of using a mitered corner instead of the square corner in many applications. But the square-corner mechanical faste ing method left something to desired as far as strength of joi was concerned.

At about this time, resistan welding was gaining acceptance the nonferrous metalworking fie Machines that would resistance we aluminum under controlled fo conditions were being develop and perfected by Thomson El tric Welder Co., Waltham, Ma Cupples engineers investigate bought a machine; now obtain "c ceptionally high quality joints."

The welding machine, a Tho son Model F-4, rated at 250 KV features a patented mechani called Synchromatic, a weld g regulator, and work clamps that in a horizontal and a vertical pla The Synchromatic is the key to w quality in aluminum; it synch nizes the transition between flash and upset. Momentary interrupti associated with cam arrangeme are avoided; welds are made the stant the metal becomes wet.

Mechanically, the system con of a pneumatic pushup cylinde snubbing cylinder and flow con valve, a crank, and linkage necting to a movable platen. Tim with the flashing cycle of the chine, the air cylinder actuates crank which, through the link advances the platen that holds section of the work. The snubb cylinder, acting against an cushion, operates in conjunc with a check valve and the c



■ *Short sections of heavy extruded aluminum are flash welded in Thomson's F-4 machine. Operator locates work using pilot pin on dies to position it properly. Clamps are actuated in pairs or in unison; Synchromatic at right automatically controls transition between flashing and upset. Photo at top of page shows portion of U. S. Air Force Academy for which Cupples flash welded about 3000 curtain wall frames and 900 sashes.*

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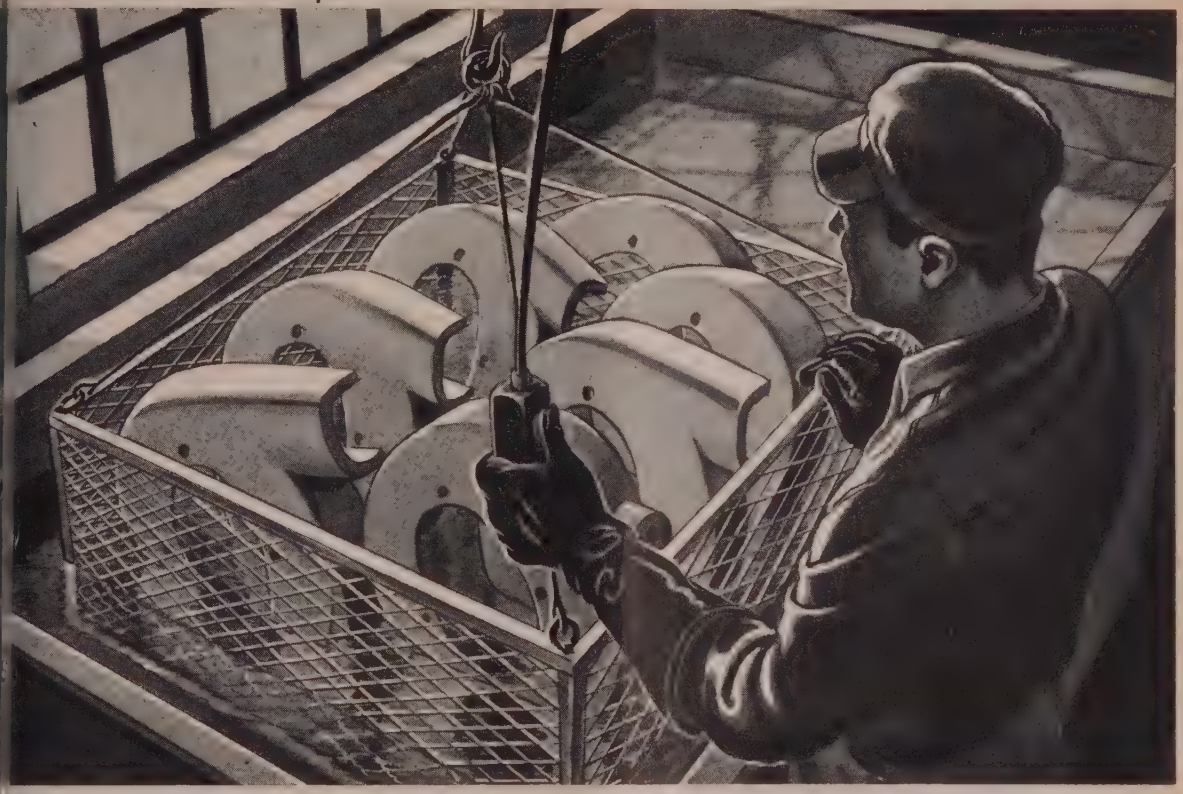

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to regulate pressure on the platen at any given time in the cycle.

The geometry and number of extruded shapes produced at Cupples' St. Louis plant require a clamping system on the machine that acts in two directions. There are four clamps. One set moves up and down; the second set in and out.

Clamping force exerted on the work reaches 20,000 pounds vertically; 4,000 pounds horizontally. Controls are through two foot switches. Depressing one activates the left-hand horizontal clamp and, after a brief delay, the left-hand vertical. The same sequence follows for the right-hand set when the second switch is depressed.

When desired, all four clamps can be sequenced automatically simply by moving a selector switch on the front of the welder to the appropriate setting and depressing either foot switch once.

Depressing a push button starts the weld cycle. Flashing and upset are regulated automatically by the Synchromatic mechanism. Adjustments necessitated by varying thickness and shape of extrusions may be made on calibrated scales.

Regardless of the size or weight of an extruded shape, it is mitered to a 45 degree angle. To weld the corner, the operator inserts the work into the welding dies, butts the mitered edges, then actuates the clamps. The proper dimension between work pieces is maintained automatically before flashing starts by means of a gapping device that moves one platen a few thousand of an inch.

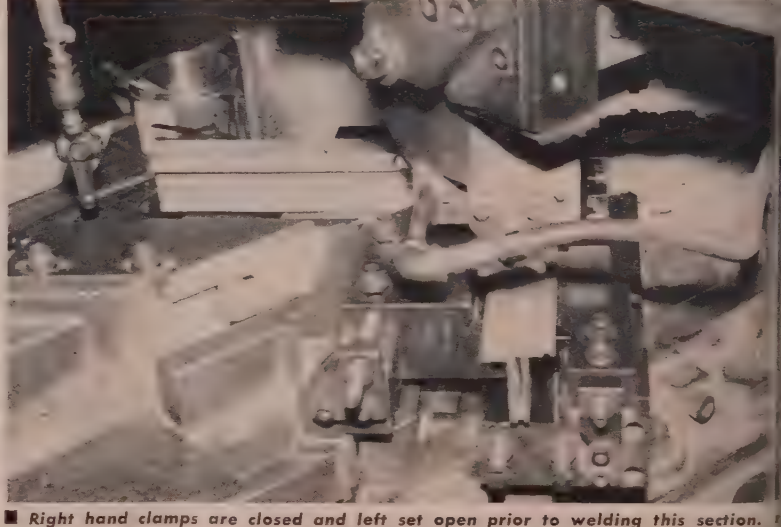
A pivotal, ring type suppo mounted on the machine frame ea handling and positioning of lo sections as they are clamped in t unit. A pilot pin added to the d engages a punched hole in wo pieces to decrease alignment ti when fitting the work in the di

Die Cost Justified

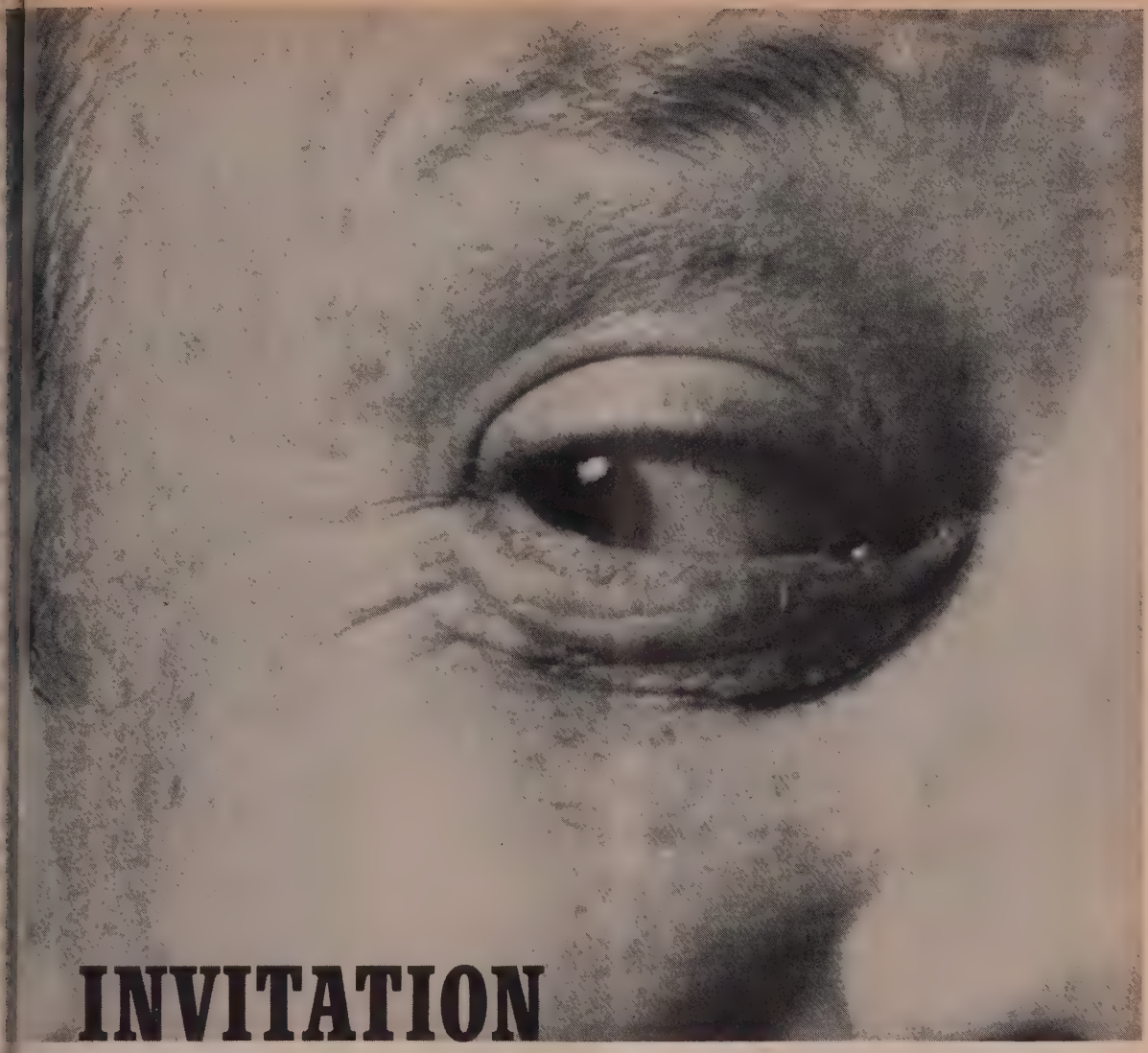
Dies to accommodate all t shapes being produced represent substantial outlay for Cupples, b to date is warranted by the abb viated assembly time that resu The company's series 1700 syst of standard curtain wall componen for example, take about seven s onds per joint to weld. Small lighter members in the 900B s tems take from three to five secon per joint excluding clamping tim Assembly rates, including cleani that may be needed, average abo 400 frames per eight-hour shift.

Production personnel recogn that flash welding is not the answ to all their assembly problems. T design life of any extruded sha often is short and thus poses pro lems in standardizing welding di Short runs of different shapes m defy setup efficiency.

But by using some foresig grouping similar shapes for weldin and knowing their equipme Cupples' engineers have been al to assemble components for th curtain wall system at competit costs and with high joint quality



■ *Right hand clamps are closed and left set open prior to welding this section. hose seen in photo is used to clean spater from platens after weld is made. Pinch dies on machines remove excess around weld automatically.*



INVITATION

to a metals distributor with a keen eye for business

You've built up a good business in certain metals. And, as an up-and-coming distributor, you have an eye open for more business. You are therefore invited to distribute aluminum as provided by Fairmont, the up-and-coming source.

Why Fairmont?

Because Fairmont is big enough to meet all requirements in aluminum widths (up to 72″), alloys, gauges, finishes, patterns, sheet, coils, circles, blanks. And—because Fairmont is expanding intelligently, will never be *too big* to give you service.

Fairmont field men, branches, communication system, and our own truck fleet, are organized to give your order, large or small, personal attention all the way.

Write to A. J. Snider, Manager, Field Sales. Better still, telephone. Our number in Fairmont, West Virginia, is *304-363-3000*.

from the expanding aluminum source

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Aluminum's Gains Brighten Die Casting Outlook

American Die Casting Institute likes what it sees ahead for the industry next year. Important technological gains described to ADCI membership at Chicago meeting. Bauer wins the Institute's Doehler Award. Walter Brown elected ADCI president.

ACCELERATED activity in the last half of 1961 is expected to bring die casting industry sales to near-1960 levels despite a relatively poor first six months, according to the American Die Casting Institute.

ADCI, an association representing a large percentage of the nation's custom die casters, also anticipates a continuing upward trend in 1962. As always, the prospect of greatly increased automobile sales encourages this view, although shops that have avoided Detroit business like the plague tend to agree.

As this is being written, however, the Detroit oriented die casters could have their dreams shattered by a UAW strike. But if there is no prolonged stoppage, auto production is expected to go beyond 6.5 million cars, which will benefit the zinc die casters particularly.

Aluminum Sales to Top '60

Custom die casters who attended ADCI's annual meeting at the Edgewater Beach Hotel in Chicago late last month were told that total die casting sales would fall below last year's achievement, but that aluminum die casting production could top the 1960 output of 182,250 tons. Zinc activity fell 10% below the 1960 production level of 312,500 tons, while brass and magnesium seem to be ending the year strong, the Institute reported.

The Institute announced development of "a completely new concept of applying vacuum, and of massive venting" to assist in the production of superior quality die castings. The new technique, called the DCRF Vacuum Method, was perfected by the Institute's Die Casting Research Foundation. The 120 ADCI members are eligible for a license to use this patented technique.

"The DCRF Vacuum Method is one that can be readily used in connection with any existing die and die casting machine," a DCRF report said. "Continuous massive evacuation of the die cavity until it is completely filled with metal is permitted without the use of a valve in the vacuum passage. Direct, continuous vacuum level measurement in the cavity through the casting cycle is permitted.

"Massive venting may be used without vacuum or, where warranted, relatively high vacuum levels can be obtained. Consistent, reproducible evacuation to 27.5 inches of mercury is practical."

The Foundation believes that its new development will broaden use of the die casting technique and do much to improve the die cast product "in certain cases where high surface finish, pressure tightness, or a high degree of section strength and uniformity is required."

It was also pointed out that, by eliminating blistering or scaling due to porosity, the new technique would beneficial for applications where hi temperature baking or surface shot bla ing is required.

Plans are afoot for non-member well as Institute member licensing the DCRF Vacuum Method, which already been put to excellent use some members, the Institute reported.

A highlight of the meeting was t speech given by Alfred F. Bauer, ma ager of Doehler-Jarvis Div'n, Nation Lead Co. Dr. Bauer had been present with the Institute's 1961 Doehler Awa for outstanding contributions to the vancement of die casting.

What Bauer Sees Ahead

In surveying the future of die castin Bauer forecast that aluminum wou have the greatest growth, whereas zi had all but covered the field of possible uses. Aluminum, he indicat still had new fields to conquer, than to its high strength.

Magnesium's best chances as a casting metal lie with the auto indust Bauer said. He hinted, however, that t price would have to come down.

As far as die casting machines concerned, Bauer suggested that th have reached the limit in size and w now come in for refinements in desi that will improve the product. Bet control systems that will elimini manual variables on cold chamber

Doehler-Jarvis's A. E. Bauer 1961 Doehler Award Winner

Kiowa Corp.'s Walter E. Brown President, ADCI

W. G. Newton, Jr., Newton-N Haven Co., Vice President, A

will be one phase of the move
omation. The die casting process
er suited to automation than any
method of casting, Bauer said.

nting to the growth of captive die
g shops in the automotive plants,
said that, despite admissions of
iency and poor product quality,
of these captive facilities are be-
nlarged. In other cases, however,
companies are reverting to the old
ce of farming the work out.

e Doehler-Jarvis executive said that
xtent of this return to the custom
asters depends on how much they
ibute to advancing the science and
oving the product.

vid Laine, ADCI's executive secre-
launched a vigorous attack against
cutting by zinc and aluminum
ers.

e decry price discounting in the
markets," Laine said. "Zinc and
dary aluminum smelters are selling
under the published price. This
a sound basis for doing business.
esn't help the metal industries."

t Laine hailed the action of Apex
ing Co. in reducing the prices of
ut two of its alloys, asserting that
ction would only "make official"
nder-the-table pricing that had be-
general practice.

erscores Safety

furnace explosion which killed two
njured many more employes of the
Reduction Co. plant in South Chi-
gave extra meaning to ADCI's in-
in plant safety. One of two Austin
illegren Awards this year went to
nan Dress, Precision Castings Co.,
of Fulton Industries, Inc., Cleve-
, Ohio, for his outstanding service
he Institute's National Safety Com-
ee. Dress has long been devoted to
ause of operating safety in die cast-
plants.

C. Cornell, vice president, Lite-
l Dicast, Inc., Jackson, Mich., won
second Lillegren award for his out-
ling service on the Technical Com-
ee of the Die Casting Research
ndation.

arshall R. Nathason, a senior at
fornia State Polytechnic College,
the $350 Irving Hexter Award, and
ty Citations were given to 13 Insti-
member companies that had estab-
d outstanding safety records over
past two years.

he new president of ADCI is Wal-
E. Brown, executive vice president,
va Corp., Marshalltown, Iowa. He
just completed two terms as Institute
president. New vice president of
Institute is W. G. Newton, Jr., presi-
t, The Newton-New Haven Co.,
t Haven, Conn.

STANAT SLITTERS OFFER
New Economy!

Even the inexperienced operator can easily produce virtually BURR-FREE results while holding tolerances as close as .001" with the Stanat Slitter. Ease of operation is inherent in these versatile slitters due to the many exclusive Stanat features such as:

- **SINGLE HANDWHEEL SCREWDOWN** — simplifies adjustment of arbor.
- **RECOIL TENSION CONTROL** — can be adjusted while slitter is in operation, to produce tightly wound uniform coils.
- **DUAL SCRAP WINDERS** (One for each trim cut) — simplifies disposal of excess material.
- **CORE PLATE RECOILER** — provides easy removal of tightly wound slit coils without telescoping or unwinding; frequently permits one man operation of entire recoiling line.

Core Plate Being Removed With Finished Coil

Stanat gang slitters are available in a complete range of sizes and capacities. Find out more about these economical slitters today. Write for Bulletin #569.

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WESTBURY, L. I., N.Y.

MFR'S OF ROLLING MILLS, GANG SLITTERS, WIRE FLATTENING MILLS, ROLLER LEVELERS AND BULL BLOCKS

COIL ANODIZING ALUMINUM

Michigan firm has two lines for continuously anodizing aluminum coils; says such pre-finishing cuts cost 15% to 20% and gives fabricator advantage of handling and storing already protected metal.

by K. B. Rhodie, Associate Editor

YOU can cut anodizing costs 15 to 20%, substantially reduce material handling, and have finished products coming off your fabricating lines if you work from a pre-anodized web of metal, claims Coil Anodizers Inc., Muskegon, Mich.

Such advantages will help minimize manufacturing costs by reducing finishing and labor expenditures, and by speeding up your over-all operation. This is what Coil Anodizers says, and its claims may be valid if the firm's own success is any indication of how useful an anodized coil is to a manufacturer.

Back in the early 1950's Coil Anodizers' president Herb Kersman started working with the idea of anodizing coiled aluminum sheet. His plan was to develop a job shop operation in which he would finish complete coils of metal and sell them to manufacturers who would make products from the pre-finished material.

"We wanted to give the manufacturer the opportunity to start with the finish," explains Kersman.

It wasn't until 1956, after 2½ years of designing and engineering the equipment needed for such a continuous anodizing operation, that a pilot line was set up. Production runs were made in 1957, and the firm's facilities were augmented so that metals could be colored or chemically brightened. Sales grew steadily and by mid-1958 the company was operating three shifts a day.

Just last year a second continuous anodizing line was added, and before this year is out, a third is expected to be in operation—this one for wire and foil.

Coil Anodizers' operative lines can handle any aluminum alloy ranging in thickness from .003 to .051 inch. One line takes coils up to 48 inches wide, another is used to process aluminum strip; runs several webs simultaneously.

A manufacturer can specify the mil thickness he needs for his product and also has his choice of satin etch or chemically brightened finishes offered either clear or in colors. A bright or satin etch finish can also be applied to textured metals. All standard colors can be used including copper, yellow, bronze, blue, green, red, black and two shades of gold.

Of course, all anodized products can't be fabricated from a pre-anodized coil, but the array that can be is extensive: Weatherstripping, marquees, storefronts, suspended ceilings, storm door kickplates, patio furniture, name plates and tags, knob inserts, antenna tubing, moldings, all sorts of trim, toys, electrical components, utensils, tile, etc.

Produces Tough Coating

In manufacturing these products the anodic film, either clear or colored, satin or bright, has successfully withstood such metalworking operations as stamping, rolling, bending, forming, embossing and perforating.

An example of a product using pre-anodized aluminum coil is the suspended ceiling in the new National Bank Building of Detroit. The ceiling, called Bohnalite, was manufactured by Bohn Aluminum and Brass Co., Detroit.

The ceiling consists of 2½ by 5 foot sections having a hexagonal pattern formed by bonding together corrugated aluminum strips. Each hexagon is 1¼-inch across the flats. Panels come in two depths — 1¼ and 2 inches.

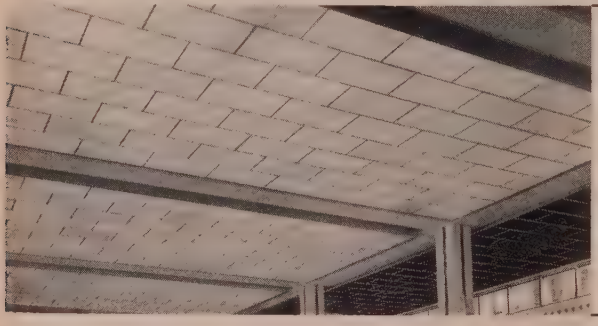
To make the ceiling sections Bo first corrugated .010 inch thick pre-a dized coil. The formed sheets were th cut with each containing the same nu ber of corrugations. Next, sheets w roller-coated with an adhesive, ass bled and cured. Dried panels were th sheared into strips across the corru tions and framed with an extrusion

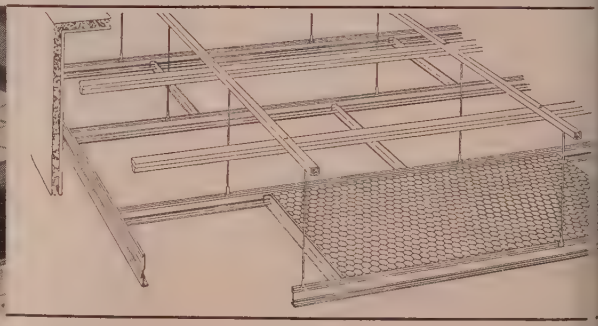
An interesting tool used in the coi gating operation was a Rol-Di-Feed u made by H. E. Dickerman Mfg. C Springfield, Mass. It is self-contai and cam operated and mounts on press. Its function was to feed the m into the corrugating dies at a steady p so the resulting formed sheets produ a uniform hexagonal pattern when strips were bonded together.

Anodizing a coil requires the sa procedures, followed in handling sn parts. The difference comes, expl Coil Anodizers, in the close controls t are placed over the three import variables in the anodizing process—ti temperature, current. These must automatically and precisely contro for successful coil anodizing.

We can trace a coil of aluminum travels through a 127-foot line an chemically brightened to learn exa what steps are involved and what ins tion procedures are utilized to as exact control over the process varia

The aluminum is placed on an coiler which feeds the metal into pre-treatment portion of the line. H a caustic etch solution, supplied Hooker Chemical Co., Montague, M cleans the metal and removes all imp ties from its surface, but doesn't the material. A cold water flush, a through a desmutting tank and a fo





Portion of suspended ceiling in National Bank Building of Detroit (above) shows attractiveness of installation. At right, drawing shows how 2½ by 5 foot panel is secured. Hexa in each panel are 1¼ inches across the flats.

LET

Superior

DEVELOP YOUR
ALUMINUM
"TRIM IDEAS"

's how one company used Superior In-
ies' engineering services and production
ties in planning its metal trim require-
s for a new product.

and it wound up with beautiful, special
ns to match functional and decorative
irements of an exquisite AllianceWare
ory vanity.

Muller-Munk Associates designed the
nceWare vanity and also the aluminum
. Superior was called upon
neet the specifications and
ch uncompromising me-
ical accuracy and finish.

ler one roof, Superior
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tersinks and notches the
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BACKSPLASH TRIM
Satin anodize finish, drilled, countersunk for #5 screws . . . custom design.
SIDE
Satin anodize finish, punched with ⅛" diameter holes . . . special design.
TOP SIDE
Satin anodize finish . . . makes a beautiful decoration.
BOTTOM
Satin anodize finish, punched with ⅛" diameter holes, random centers.

ALUMINUM EXTRUDERS • ANODIZERS • ARTRIM MOULDINGS

SUPERIOR INDUSTRIES INC.

3787 OAKWOOD AVENUE • YOUNGSTOWN, OHIO

cold water rinse follow.

Next pre-anodizing step is to chemically brighten the aluminum using a standard process. A hot water rinse and a cold water spray rinse complete pretreatment and leave the metal with a clean and lustrous surface.

The coil then passes through a 52-foot long anodizing tank containing over 7000 gallons of sulphuric acid solution held at 72°F, and which is being charged with a current of 3800-3900 amps. Next, the anodized coil is rinsed twice with cold water. This keeps surface pores open in case the metal is to be dyed.

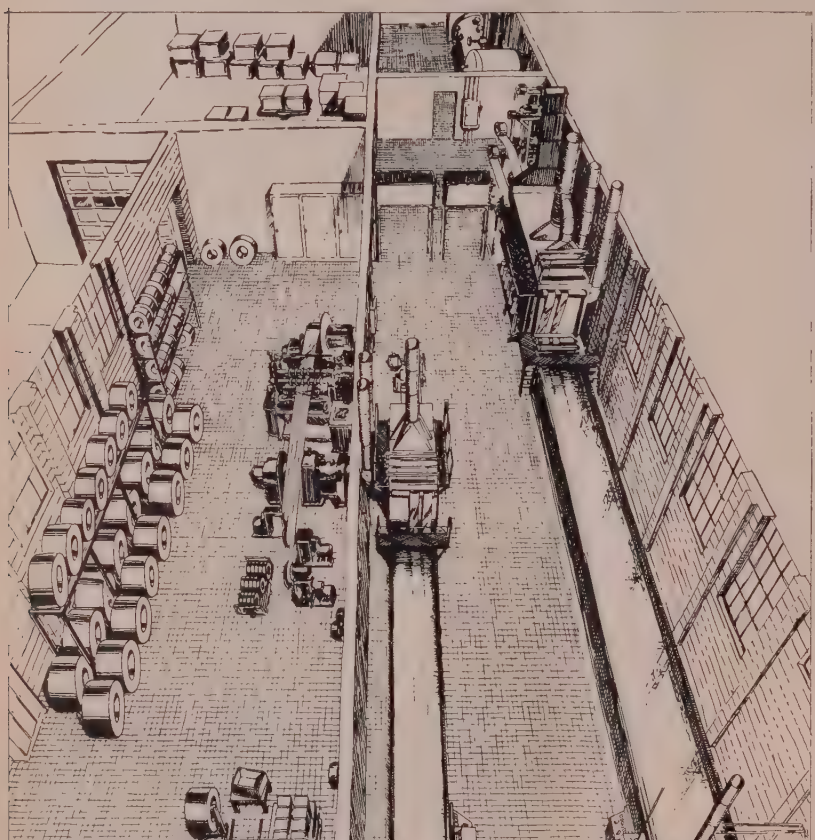
If color has been ordered the strip goes through a dye station, and is rinsed again. If there is no color involved, the metal goes directly to a tank containing a solution of purified water and nickel acetate salts maintained at between 200 and 218°F. This solution seals the anodic film. The strip is again rinsed with cold water, then dried with radiant heaters, and recoiled.

The metal uncoils and flows from one step in the line to another automatically, but while it is making the trip operators are keeping a constant vigil. Each hour temperatures, current density and pH factors are checked. And the coil is visually inspected with a magnifying glass at each stage of the anodizing process.

After a coil is dried and rewound it can be slit, if requested, on the firm's 24-inch capacity Yoder slitting machine. If this operation isn't needed the metal goes directly to the packing room where a special upender can rewind the coil to any specified arbor size. Only steps left then, are packing and shipping.

Coil Anodizers' lines can be adapted to produce anodic films suitable to protect and decorate a wide variety of products. The three determinants of film thickness — time, temperature and current — operate in wide ranges to accomplish this.

Speed of coil travel through the line ranges from 2 to 10 feet per minute;



■ ***Coil Anodizers' plant has 48-inch wide coil anodizing line at far right, strip line across from it and along inner wall. Also in right portion, but behind partition at top, is machine shop and boiler room. Along inner wall on left side is Yoder 24-inch slitting line, near bottom leveling and sheeting equipment.***

anodizing tank temperatures range 68 to 80°F and are maintained at for a specific run; amperage ca boosted to 9000 amps.

Now that we know what coil a ing is, what application it has seen how the process is performed, w examine more closely the advantag company claims for its process. they are numerous, according t testimony of B. L. Sanford, the pany's sales manager.

"The anodizing process offers a uct corrosion and abrasion resis and both these advantages are en by the ultimate consumer," point Sanford. "But by using pre-ano coils the fabricator also gains the vantages. The result is he doesn't to exercise as much care in handlin coils, or in storing them, as he with untreated metal.

"Another aid to the fabricator i he has finished products coming manufacturing lines. This reduces dling since parts must only be asse or packed and shipped rather moved to a finishing department, o out for anodizing first. And this to still another dollar saver — shi a coil to us is a lot less expensive sending many pieces to an anodiz

Costs Cut 15% to 20%

Anodizing a coil costs from 15 to less than part anodizing, dependi the part size and finish required, Sanford. The main cost-saving here is that racking is completely inated. And the savings remain though parts are blanked from th and the skeleton discarded, he say

"In comparing finishing costs, anodizing shows up very well whe final product is very small and mig quire intricate racking if anodized manufacture," says Sanford.

Quality is a vital concern to any ufacturer, and here, too, pre-ano coil is extolled. Mainly, says Sa because of the close mechanical c kept on current and temperature. means color match and film thic are maintained more accurately thr out a job. "And the job can be cated to very close tolerances late cause we can recreate the same tions under which the original wor done," Sanford adds.

Color match and film unifo aren't accomplished easily in part dizing because two important fa current absorbancy and anodizing time, are reliant upon manual tions. Proper current absorbancy result only after proper racking, parts are removed from the bath operator, whose timing will vary, th maybe only slightly. In coil anod of course, there is no racking an bath time is mechanically controlle

At Consolidated Aluminum Corp., Jackson, Tennessee . . .

Mr. Rudy Rentsch, Casting Plant Superintendent, and F. S. Sperry, Plibrico distributor inspect completed Plibrico lining

. furnace volume up 9% . . . bath volume up 12.6% with Plibrico designed and engineered lining

Geared to giving prompt service themselves, Conalco expects it from suppliers, and gets it from their local Plibrico man. But they get even more, as you can too . . . the benefits of Plibrico's result-producing refractory engineering and construction skill.

Here's the proof . . .

THE INSTALLATION: Combining plastics, castables, and a ramming mix especially formulated for aluminum furnaces, a complete Plibrico lining was designed for No. 2 melting furnace, Sidewalls were thinned down. The old sprung arch was converted to a flat suspended one. Refractories included Pli-Ram "80-S" in the metal zone, Superal above the metal line, and Super for the arch, all backed by selected castables.

THE RESULTS: Thinner wall construction boosted the aluminum bath capacity 12.6%. Furnace volume was increased 9%, making it possible for Conalco to up their melting rate when desirable. Even though thinner, Plibrico walls reduced heat loss below former lining levels. And flat suspended construction keeps the arch completely independent of the sidewalls. No need to disturb the arch for any future sidewall repairs.

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CATALOGS 68 & 71 cover plastics, ramming mixes and castables giving advantages and applications.

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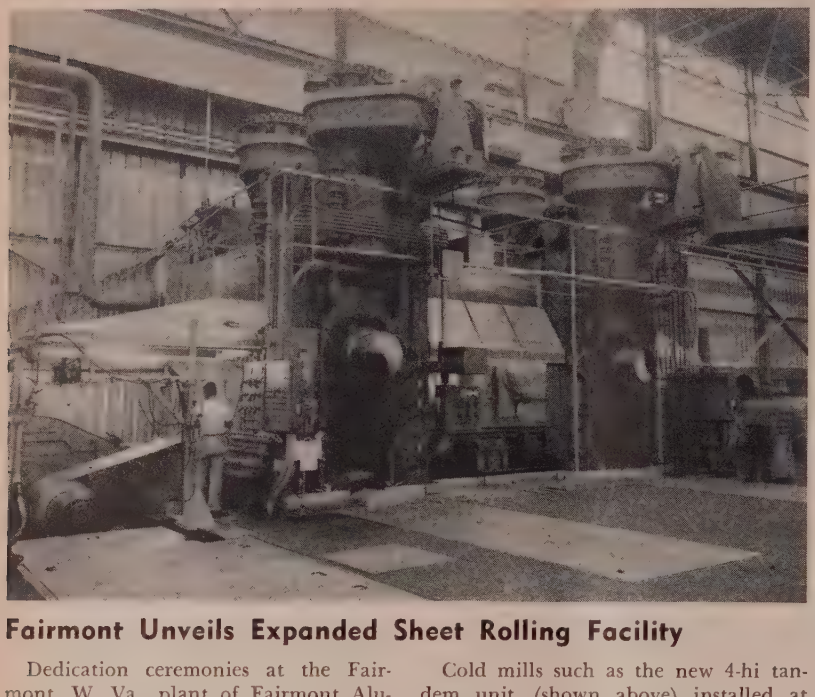


Fairmont Unveils Expanded Sheet Rolling Facility

Dedication ceremonies at the Fairmont, W. Va., plant of Fairmont Aluminum Co. September 30, marked completion of a facilities expansion program that began in 1959.

At that time Cerro Corp., Fairmont's parent company, decided to broaden its participation in the aluminum sheet market. Cerro appropriated $10 million for additional equipment and for use as working capital.

Last year Fairmont became a partner with three other firms — Bridgeport Brass Co. (now a division of National Distillers & Chemical Corp.), Scovill Mfg. Co., and Aluminium Limited — in a cooperative effort to produce aluminum reroll sheet.

Cold mills such as the new 4-hi tandem unit (shown above) installed at Fairmont boosts the plant's sheet producing capacity considerably. Fairmont also has a new single stand, 4-hi unit.

Fairmont Aluminum will take one-fourth of the reroll sheet produced in the jointly-owned hot breakdown facility now under construction at Oswego, N.Y.

At the dedication ceremonies, Robert P. Koenig, president of Cerro Corp., made a direct attack on the price policies of the primary aluminum producers, singling out commodity pricing and special credit terms to favored customers as abuses that should be corrected.

He said "responsibility and maturity appear to be lacking" in the industry.

Titanium Welding Gains Suggest Use In Subs

It may be possible to fabricate nuclear submarine hulls of titanium alloys as the result of new welding procedures developed at Battelle Memorial Institute, Columbus, Ohio. Hulls made of titanium alloys — which are as strong as many steels and weigh only about two-thirds as much — would provide submarines with greater speed, payload, and diving depth.

In a technical paper presented September 28 before the annual meeting of the American Welding Society in Dallas, Battelle welding experts reported that they have produced crack-free welds in 120,000-psi-yield, 2-inch-thick titanium alloy plates. Weld joint properties equaled or exceeded the properties of the base alloy.

"On the basis of these welding studies, we believe that titanium alloys can be used for submarine hulls," the Battelle men said.

The thick-plate welding study is part of a comprehensive program sponsored by the Bureau of Naval Weapons to evaluate titanium alloys for submarine hulls. Previously, ⅝-inch titanium plates were the thickest that had been welded — and even at this thickness there was extensive weld-joint cracking, according to Battelle.

To prevent contamination which might cause weld cracking, all welding was done in an argon-filled chamber. Welding conditions of 365 amps, 32 arc volts, and a 15-inch-per-minute travel speed were used to produce heat input of about 45,000 joules per inch.

The combination of yield stre and impact properties was obta with commercially available Ti-6A alloy plates and an experimental 2Cb-1Ta alloy filler wire. However, cording to Battelle, plates with e better strength and impact prope might be produced by making sl changes in the composition of the p and filler alloys.

Alsco, DuPont Team Up On New Siding Product

Aluminum lap siding, said to have exceptionally durable finish, is a product of Alsco Inc., Akron, O The siding is called Alsco Premium and carries a 30-year written guaran The new product is being introdu in four test market areas across U. S. It will not be available on open market, however, until next su mer.

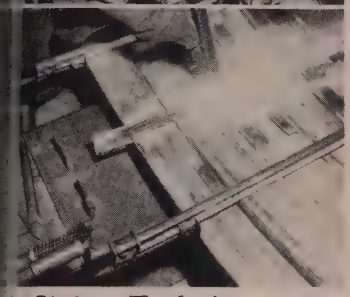
Alsco Premium 30 is laminated w Du Pont Tedlar polyvinyl fluoride fi Fifteen years of actual weather test of Tedlar has demonstrated the ef tiveness of this new approach to sidi Alsco said.

"Finishes of Tedlar are not o proven to be three to four times toug at the initial application than the c ventional coatings, but they retain t beauty under longer periods of posure," the company reported. "It found that even after ten years expos to the Florida climate, the film fir was still tougher than liquid finis immediately after their application.

So certain is the Alsco managem of the durability of Tedlar that i are issuing a 30-year written guarar on each panel of Premium 30 sidi The interlock of each panel is stam with the name of the siding and code number. The panels are registe by Alsco to assure the consumer t he is getting genuine Premium siding. Alsco guarantees the surface this siding against cracking, corrod splitting, flaking, pitting, and chalki Assignment of a 30-year guarantee aluminum siding is a first in the bu ing products industry.

Harry Sugar, president of Alsco, c mented that "We are very proud play a part in pioneering the use this polyvinyl fluoride film as a fi for aluminum siding. The durable qu ties of "Tedlar" and the rugged t it has withstood, assure us that mium 30 siding will stand as a gr advancement in the field of main ance-free living for the American ho owner through the use of alumin siding."

"From all we have seen," he c tinued, "we are confident that Premi 30 siding will live up to its 30 y written guarantee."



Sizing Technique
d For Reactor Rings

remely close tolerances are ed by a unique compression sizing tion on large diameter rings made heavy extruded aluminum bar by s Mfg. Co., Carmi, Ill.

veloped for use by the Atomic gy Commission in nuclear reactors, ectangular 2-11/16 inches by 3-7/8 s solid 6061-T4 extrusion. 28 feet ches long, is first progressively d to 107¾ inches outside diameter olling on equipment using a hy- ic ram or "bull-dozer."

e or six rings, jigged side by side separated by 5/32-inch spacers, are consumable electrode (MIG) ed on the inside, turned 180 de- , back chipped, and finish welded he outside. Filler alloy 5356, 3/32 diameter wire is used (see photos). ter separating each ring by sawing, areas are finish dressed to contour ctrusion. The final ring dimensions 07½ inches are developed by using ially designed compression sizing pment. By compression sizing er than conventional stretching, diametrical tolerances of minus ing plus 1/16 inches are obtained. ort is that 215 rings were made out a single rejection.

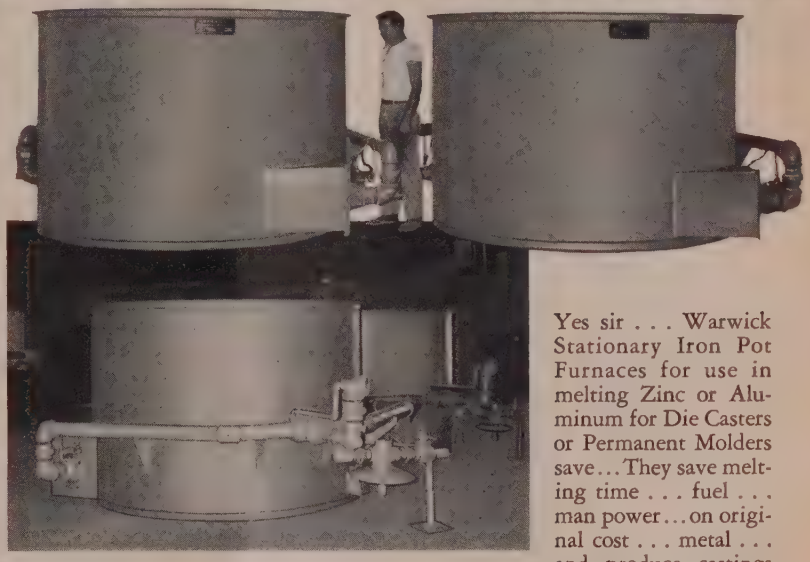
nsolidated Aluminum
Build Primary Plant

onsolidated Aluminum Co., Jackson, n., producer of high purity alumi- and aluminum sheet in various ys, plans to build a $28 million pri- y plant on land acquired from the nessee Valley Authority. The 235- site is a few miles north of John- ille, Tenn.

urchase price was reported to be 500. Construction is said to be duled to begin in the late fall.

WARWICK IRON POTS
FOR DIE CASTERS

The $avingest Furnace You Can Buy



Yes sir . . . Warwick Stationary Iron Pot Furnaces for use in melting Zinc or Aluminum for Die Casters or Permanent Molders save... They save melting time . . . fuel . . . man power... on original cost . . . metal . . . and produce castings of such a superior quality that rejects are at a minimum. In fact, they save you . . . money!

Designed and built by Warwick Foundry Engineers and backed by over a half century of operational experience, each and every Warwick Furnace assures highest efficiency, economy of operation and years of trouble-free service. Capacities range from 125 to 10,000 lbs. of Aluminum or 350 to 27,000 lbs. of Zinc.

FOR LARGER CAPACITIES, FOR THE SMELTER, EXTRUDER, BILLET CASTER OR ANY OTHER PURPOSE, WARWICK MAKES THE BEST DOUBLE CHAMBER, DRY HEARTH AND REVERBERATORY FURNACES . . . ANY SIZE DESIRED

WARWICK STATIONARY CRUCIBLE ALUMINUM MELTING FURNACES

Here is a furnace that will prove a decided asset to any Die Casting or Permanent Mold Plant. Used as a breakdown or holding furnace or both it will produce perfect metal for casting at the rate of 200 to 1000 lbs. Aluminum. It is designed for utmost efficiency and economy. Ease of operation and operator comfort is assured by the extra wide dip out opening and the built in heat shield.

Write, wire or call for full information today

WARWICK INDUSTRIAL
FURNACE & ENGINEERING CO.

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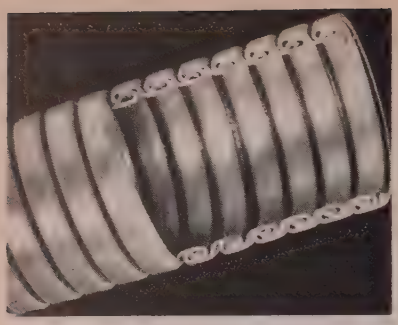

Flexible Aluminum Tubing Made by English Company

Flexible aluminum tubing, made primarily for handling corrosive gases and liquids, is a new product of United Flexible Metallic Tubing Co., Ltd., England. Production of this type of tubing has been confined to galvanized steel, stainless and bronze.

For this product, aluminum strip is rolled and slit to close tolerances and is then helically formed, by means of its interlocking edges, into tubing. A continuous sealing cord is placed between the interlocking edges to maintain pressure tightness yet retain flexibility.

The high strength alloy used, Noral 54S, offers a tube suitable for pressure service at about one third the weight of similar tubing in other metals. This is proving of special interest in road-tanker and other bulk handling applications where hoses must often be manhandled. Working pressures range from 300 psi for ¾-inch bore tubing to 75 psi for 12-inch bore tubing.

In many conditions of service, flexible tubing must withstand corrosive gases or liquids. As an example, 8-in. bore flexible tubing assemblies made from Noral 54SO strip is used by Shell Tank-

ers for flushing tanker pipelines a tanks with sea water.

For the development of this n product, Alcan Industries Limited s plied all experimental material a technical advice.

Honeycomb Panels Reduce Plastic Tooling Costs

A substantial reduction in pla tooling costs is now possible by us aluminum honeycomb material in pl of solid laminates, claims Hexcel Pr ucts, Inc., 2332 Fourth St., Berkeley Calif.

The use of 1/2 inch thick ACG alu num core material not only provi a rigid and lightweight structure, H cel engineers report, but it also el inates much of the costly and ti consuming layup work necessary fabricating conventional plastic tools

For example, where it might requ 25 to 50 plys of facing cloth to bu a specific tool, the same results can obtained much less expensively a in faster time by applying three p of glass cloth impregnated with epo resin on each side of 1/2 inch alu num honeycomb.

The compressive strength of th honeycomb-plastic stiffeners varies fr 400 to 500 psi, depending on the c size of the aluminum honeycomb. H cel engineers point out that manuf turers using this system of pla tooling are not only obtaining tremely low-deflection tools, but tooling costs by more than 75%.

Compared to conventional metho honeycomb structures have a wei advantage of one-to-six. Where usually requires two men to lift a so plastic panel, a honeycomb panel the same size can be lifted with hand.

In field tests, Hexcel engine worked with one manufacturer who l a master tool constructed of plas aluminum and steel weighing 20,(pounds. It was replaced by a hon comb plastic tool which weighed than 2500 pounds.

This manufacturer has replaced his solid laminated master tool s eners with plastic-faced alumin honeycomb; in one year he has reali a saving of more than $170,000, c pared to the cost of using an equival amount of solid laminates.

Another feature of honeycomb, s Hexcel, is that it is ideally suited plastic tooling wherever weight duction is necessary and specific def tion a problem. Under one field a laminated honeycomb panel tool subjected to a concentrated load 1150 pounds for 500 hours. Ini deflection was .01325; total creep def tion was .00525 and recovery after l removal was 100%.

Kenfucius say: *Difficult to show profit with old specifications?*

KEEP CURRENT WITH KENVERT

NEW PRODUCTS & NEW APPLICATIONS

KENVERT II-X
A powder added to water with no acid addition required gives olive drab for optimum paint adhesion on zinc die castings—also meets 96 hour salt spray on zinc and cadmium.

MEMO KENVERT #35
non-fuming, non-chromate brass bright dip used on beryllium copper tips prior to gold plate

KENVERT 11
Olive drab, followed by Kenvert 11B (dye) meets 96 hour automotive specification for black finish.

KENVERT 40
Aluminum chromate passivates awnings for 1/10th cent per sq. ft.

KENVERT-O-COLOR PROCESS
successfully applied to bulk brass dyeing of zinc plated ferrules to eliminate difficulties of brass plate.

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LICENSEES:
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EXTRUSION DIE STEELS PRESS PARTS

Requirements for high quality containers, liners, stems and die blanks for the extruding of all metals and alloys can be met more efficiently and economically by Marathon. A wide range of steel grades is available, each one offering excellent service life and machinability.

MARATHON

SPECIALTY STEELS, INCORPORATED

NEW 275 Park Avenue, New York 22, N. Y.

New Furnace Boasts Uniform Annealing of Aluminum Strip

New, high production furnaces for continuous annealing of aluminum or copper and brass strip, have been announced by the General Electric Co., Schenectady, N.Y.

Highest quality strip can be achieved since each square inch of each coil receives the same treatment in the furnaces, GE reports. This results in uniform grain size, physical properties, and surface condition. This uniformity is important where the metal is to be processed in high speed machines and/or subjected to severe forming, drawing, or rolling operations, according to officials of GE's Industrial Heating Department where the furnaces were designed.

A new jet transfer heating system is utilized in the furnaces, with the strip being heated or cooled by high velocity jets of heated or cooled atmospheres which strike the strip at right angles to its surface.

The right angle impringement washes away layers of stagnant atmospheres on the strip surface and allows the hot or cool atmosphere to come in intimate contact with the strip surface.

Sheet and Extrusions Make Compact Bus Shelt

Weather-tight aluminum shelters the one shown above are attractive stop shelters for grown-ups and sc children, while offering a new type outdoor advertising. The easy-to-e shelters were introduced by Shelter M Co., 1122 E. 33rd St., Kansas City,

The weather tight aluminum she not only offers a new medium for door advertising, but also provide public service in keeping bus riders school children protected from incl ent weather and safe from traffic.

The compact shelter, made of Ka Aluminum Diamond-Rib sheet rive to a welded structural aluminum fra measures six feet wide by six feet l and eight feet high.

Shelter Mfg. Company owns maintains each shelter, leasing 96 squ feet of double slant roof top area commercial advertisers. All shelters fully protected by insurance to c occupants from all types of hazard

New Adhesive Is Fast, Non-Staining

A new versatile, clear adhesive bonding vinyl to vinyl or vinyl to m has been announced by United St Rubber Co.

The new formulation, a synthe resin-based adhesive, prevents solv reaction by plasticizer migration an non-staining on even the lightest colo vinyls.

On a two surface coat applicat the drying time before bonding vary from a few minutes up to minutes. In some instances, a one sur coat of the material may be used produce a strong bond. In such c the M-6105, as the new adhesive been designated, should be app liberally to the metal and the v should be laminated within one min The adhesive can be applied by br spray or roller.

The new formula was developed the laboratories of U. S. Rubber's M awaka, Ind., plant, a facility of footwear and general products divis Sales headquarters of the adhesives coatings department are also at Mi waka.

EXTRUDERS!

7 POUNDS OF HODSON'S 3211C MAKES

A Powdered Non-caustic Concentrate

440 POUNDS EXTRUDING COMPOUND

Savings up to 66% . . . does a superior job

ADVANTAGES ARE:

(1) Just add water and mix.
(2) Cost per pound of the finished compound at the press is between 4¾c to 5c.
(3) Being anhydrous, shipping charges are reduced (made via parcel post).
(4) No storage or shipping difficulty from freezing or breakage.
(5) Extends die life; reduces down time.

It is the new revolutionary HODSON Compound — No. 3211C Aluminum Extrusion Powdered Concentrate.* Material is anhydrous; is shipped in powder form. It contains the finest micronized graphite; with bactericides, fungicides, jelling, bonding and **anti-weld agents.** All free of occupational hazards and not detrimental to equipment or finished extrusions.

*Patent Applied for

Being used successfully by extruders in all areas of the United States, Canada, and several European countries.

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Name

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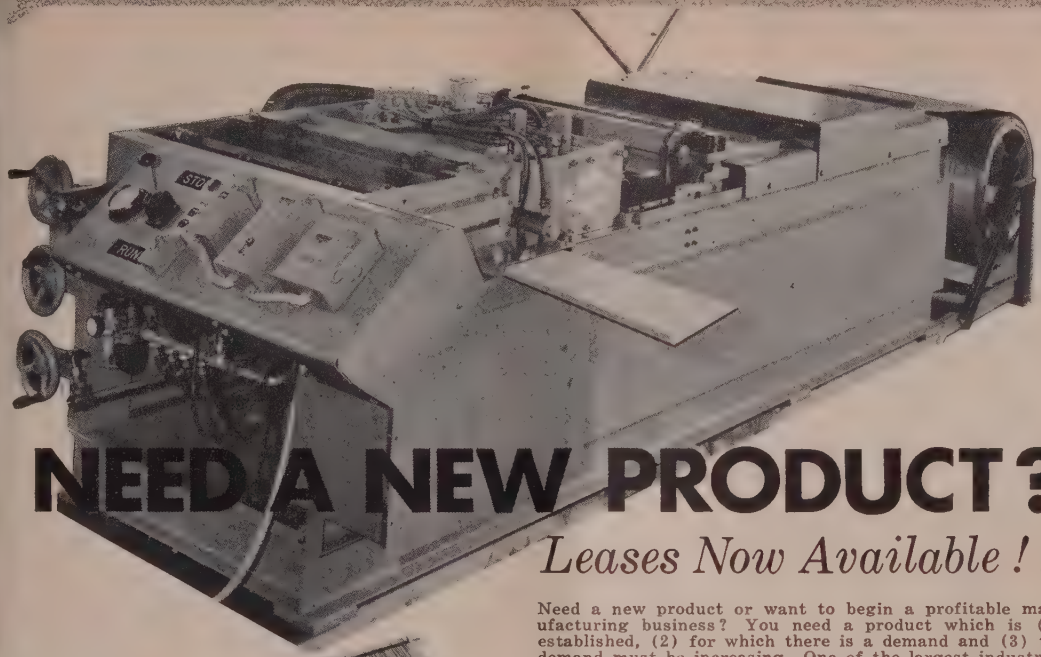
OTHER HODSON PRODUCTS ARE:

☐ Hodson 3211 C ☐ Forming Compounds ☐ Stamping Compounds
☐ Conventional Forging Compounds ☐ Smokeless Forging Compounds



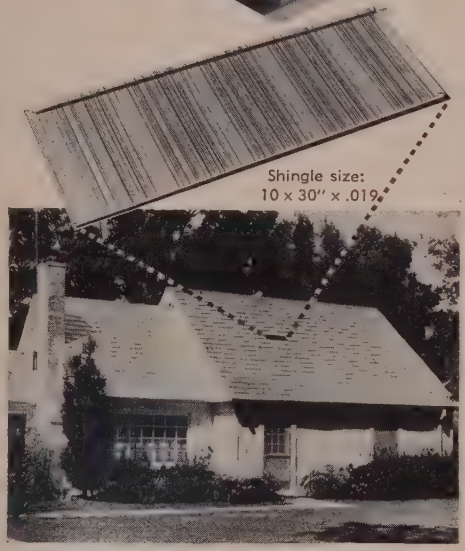
NEED A NEW PRODUCT?

Leases Now Available ! !

Need a new product or want to begin a profitable manufacturing business? You need a product which is (1) established, (2) for which there is a demand and (3) the demand must be increasing. One of the largest industries in the world today is home building . . . consequently, building supplies are in great demand. Of all such supplies, roofing and siding are probably the most noticed and carefully picked. They must be durable, heat reflective, attractive and easily installed.

Now, **you** can manufacture the best of all roofing and siding shingles. The Deville machines will manufacture approximately one square (48 shingles) per minute. They are 4-way interlocking, 10 x 30" and require only one nail for installation. The shingles are striated, suggestive of a wood shake shingle, which makes the roof glare-proof, and are available in a wide selection of colors. They reflect 95% of the radiant heat which strikes the surface and generates less than a decibel more sound than a conventionally shingled roof. . . . The Deville shingles weigh 40 lbs. per square compared to 210 to 315 for asphalt shingles.

Demand for this shingle is growing. Already it is being used by a major pre-fab home builder. Numerous contractors throughout the U. S. and Foreign countries are using it for new housing and re-roofing and siding. **Now** is the time to enter this field! Begin while the product is young and take advantage of the growing demand. The Deville Automatic Aluminum shingle machine may be obtained from International Aluminum on a Lease-Royalty Basis. Just complete the coupon below and send it to International Aluminum Co., P. O. Box 3035, Baton Rouge, La., or call ELgin 7-7527 for more information on this great oportunity.



Your greatest selling feature is PERMANENT ROOFING or SIDING . . . the initial cost is the final cost —Lasting Beauty—Lasting Protection.

Special Features

- Permanent Roofing or Siding . . . initial cost is the final cost.
- Attractive . . . Striated design . . . available in many colors.
- Light . . . weighs only 40 lbs. per square.
- Not resonant . . . rain generates less than one decibel more sound.
- Heat . . . reflects 95% of radiant heat.
- Installation . . . Installation time, 20 minutes per square.
- Rugged . . . will withstand winds up to 178 mph.
- DEMAND INCREASING and leases for the machine are **available now!**

INTERNATIONAL ALUMINUM CORPORATION

ALUMINUM International CORPORATION

INTERNATIONAL ALUMINUM
P. O. Box 3035, Baton Rouge, Louisiana

Please rush me complete information on how I may lease the Deville Shingle Machine.

I am ☐ an established manufacturer

☐ an established businessman who wishes to enter the manufacturing field.

NAME _____

ADDRESS _____

CITY _____

STATE _____

Carbonated Water Maker Anodized Inside and Out

Kidde Mfg. Co., Bloomfield, N. J., makes this Soda King syphon for home generated carbonated water. Model 6A Soda King bottles have three drawing and three necking operations, using alloy 3003 aluminum. The bottle is formed by drawing from sheet, followed by necking and formation of the bottom.

Following these operations the bottles are sanded and polished to a high luster. Finally, they are anodized inside and out for protection from oxidation and appearance. A Model 6 Soda King is gold anodized.

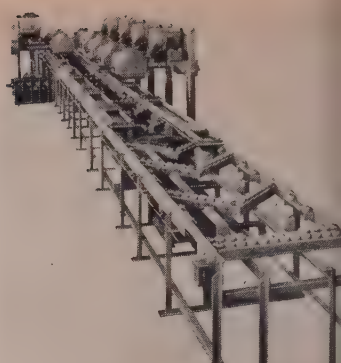
New Fastener for High Strength, High Temp Uses

A new self-locking capscrew has been introduced. Known as the Klincher Self-Locking Kapscrew, its configuration is that of a conventional hex head capscrew with a double cap, a concave head, and a seating-type, all metal, reusable locking collar. The new fasteners are made by Klincher Kapscrew, Inc., 2155 Hillside Ave., Indianapolis 18, Ind.

When the stud is pulled down and the proper torque is applied, the collar compresses causing the inside of the collar to move in and lock radially and axially on the stud shank and cap shoulder.

When the cap picks up all the load it can carry, the concave configuration of the cap permits it to adjust to the torsional load equalizing the stresses and applying constant pressure through the elasticity in the cap design. More wrench torque can be applied before exceeding the elasticity of the stud. The elasticity of the new fastener is said to be more than three times that of conventional capscrews. They are reusuable indefinitely.

Klincher self-locking Kapscrews are available in various metals, and are specifically designed for use where vibration, high tensile strength, corrosion and high temperatures are factors.



Finishes 22-Foot Shapes

Aluminum extrusions up to 22 long can be finished at speeds u 27 fpm on the Strait Line Auto unit built by Hammond Mach Builders Inc., 1609 Douglas Ave., amazoo, Mich.

Conveyor platens on the unit ca loaded and unloaded while movi production speed. The conveyor n extrusions under heads arranged to vide a buff or satin finish.

The number of finishing heads is determined by the condition o rough extrusion and the final finis sired. The unit shown above is equi with seven 20 h.p. heads to remov lines and bring up luster of shap

ALUMINUM Sheet

Top quality aluminum sheet is now being shipped from the Highland Park, Ill., plant of

ALUMINUM MILLS, INC.

Equipped with mills and auxiliaries that have been specially tooled to handle aluminum, and centrally located for prompt delivery, the Midwest's newest aluminum sheet source is ready to serve your needs.

Gauges: .125 to .006-inch **Widths:** up to 20 inches
Alloys: All non-heat treatable

Aluminum Mills, Inc.

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Throughout the world you'll find

EXTRUSION DIES *by* MOCZIK

Pictured below are some intricate shapes, thought to have been impossible to extrude . . . MOCZIK manufactured the necessary dies and these shapes are now production items. For your more difficult shapes, as well as the less complex solids and hollows, *MOCZIK will be pleased to serve you.*

The finest quality extrusion dies and support tools can only be made from the best steel

WE GUARANTEE OUR STEEL TO BE:

1. **Certified upset forgings of highest quality**
2. **Properly forged and annealed**
3. **Ultra-sonic tested**
4. **Dense and homogeneous**
5. **Uniform grain flow**
6. **Expertly controlled heat treatment**

IN THE U. S. A. AND CANADA **4**

MOCZIK TOOL AND DIE WORKS

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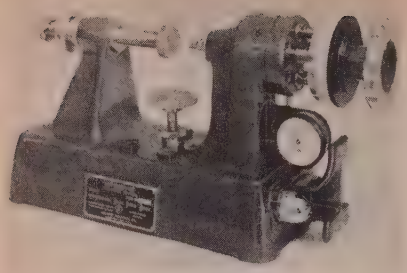
OMPLETE ENGINEERING SERVICE AND DESIGN FACILITIES • ESTABLISHED 1939 • ACTUAL EXPERIENCE SINCE 1925



Two Hardness Testers Have Simple Design

Two models of hardness testers,which are the first in an entirely new line, provide Rockwell hardness readings for all standard and special scales, and use loading and penetrators in accordance with ASME and ASTM specifications. The loading mechanism of all models has a beryllium copper spring with practically zero hysteresis and drift, thus eliminating all weights, levers, and knife edges, and providing permanent calibration.

The Introdyne Model H-1 (pictured) is the first of a series of horizontal models and, because it has no weights or levers and weighs only 21 pounds, can be readily moved from place to place for use at the job; also, the tester requires no special installation and can, if necessary, be used on a moving platform.

The Magnedyne Model attaches electromagnetically to ferromagnetic material to be tested, and is provided with an adapter shoe which permits the testing of flat as well as curved surfaces from 2 inches to any larger radius. The tester weighs 23 pounds, is completely portable, and is energized by 115 volt 60 cycles, but can be furnished for operation on other voltages.

DIVERCOAT 2-A meets **MIL-C-5541**

specification covering immersion coatings for **ALUMINUM**

DIVERCOAT 2-A produces a smooth, tight chromate coating that resists corrosion. Serves as a paint base or decorative finish.

ECONOMICAL—A low concentration solution of 1 to 3 oz. per gallon at room temperature gives excellent results and uniform coating quality.

FAST—Only two or three minutes immersion time produces a tightly adherent coating on aluminum and all aluminum alloys. Speeds production time and cuts coating cost. Another product benefit developed by Diversey research.

FOR MORE INFORMATION check postpaid reader service card. For personal on-the-spot service, call your local D-man.

DIVERSEY®

THE DIVERSEY CORPORATION • 212 W. MONROE STREET • CHICAGO, ILLINOIS

Aluminum Reservoir Roof Prevents Water Pollution

A 16-million-gallon reservoir in L cashire County, England, covering n ly four acres has been completely top with a barrel-vault roof of troug aluminum sheet.

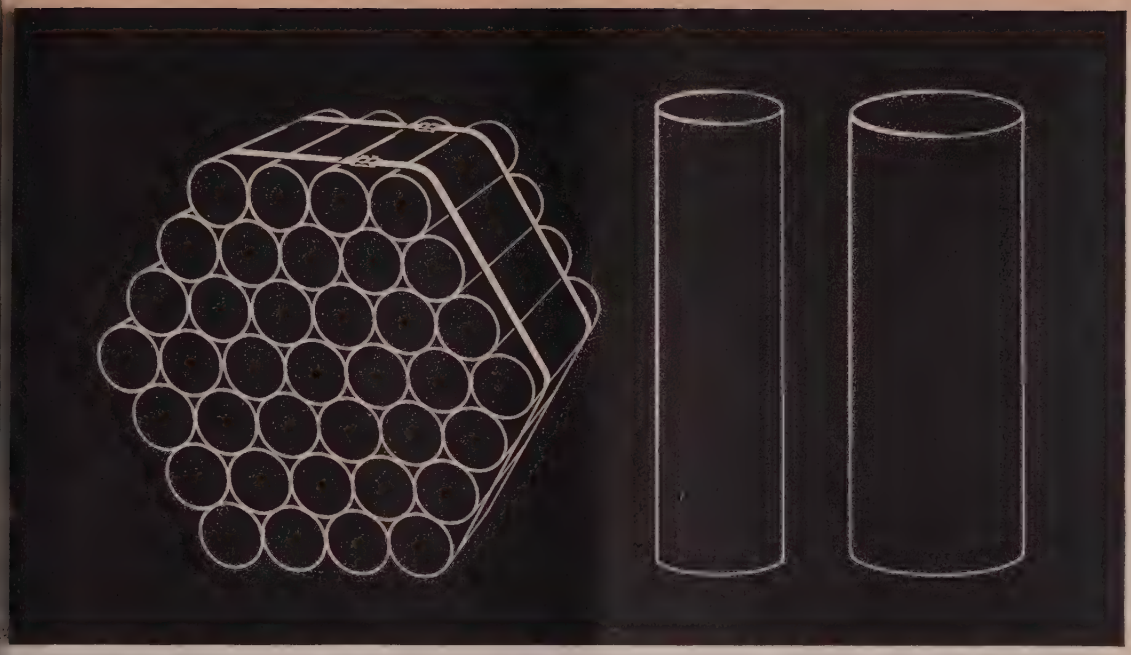
In considering renovation of reservoir, Fylde Water Board felt some form of roofing was essential eliminate water pollution.

In choosing the most suitable met of roofing, cost and floor loading w the most important factors; corruga aluminum proved to be the ans The reservoir is circular with slop sides of a gradient of 1 in 1½. entire floor and sides are concrete brickwork.

Concrete main beams of a Y-sec spanning 54 feet carry aluminum ar and are given lateral support by m of secondary beams fixed at right an

The covering is of Noral I Trough Industrial sheet, of whic total of 125 tons was supplied by A Industries Ltd., Banbury, Oxfords The span of each avenue of arch 16.44 feet and the rise at the ce 3.35 feet.

The curved sheets are secured to concrete beams by means of 3/8 diameter aluminum alloy hook-l and with aluminum and neop sealing washers, and the corrugat are filled-in at the ends with pro rubber edge strip. Side laps are of corrugations and joining is effecte means of 5/16 in. diameter alumi alloy seam bolts and nuts. The en each avenue are terminated by b work.



What's newest in Alcoa Extrusion Ingot:

HERE ARE SOME RECENT DEVELOPMENTS OF INTEREST TO EVERY EXTRUDER:

THREE FROM 6063 • Which characteristics of these versions of Alloy 6063 do *you* need? *C989 homogenized* extrudes 25 to 50 per cent *faster* than standard 6063. *C872 P homogenized* has higher tensile and yield strengths, improved hardness for structural solids. New *C914 homogenized* extrudes nearly as fast as C989, much faster than C872.

TWO BRIGHT IDEAS • Where a highly reflective finish is needed, Alloy 6463 provides it *and* the mechanical properties of 6063. Want an even brighter finish? Get it in Alcoa's new *6563*, if you can give a little in mechanical properties.

THREE FROM ONE • For architectural applications, *one* alloy, 4543, anodizes to *three* shades of gray: light, medium or dark.

ONE FOR ENAMELING • Developed by Alcoa especially for porcelain enameling, C58 provides good adherence characteristics combined with the mechanical properties of 6061 Alloy.

FIVE IN TEN SIZES • Need small billets in C989, C872, C914, 6463 or 6563? Alcoa tailors them in ten diameters: 3, 3¼, 3½, 4, 4 7/16, 5⅛, 6⅛, 7, 8, 9 in.

ALL IN NEW BUNDLES • Compact, rectangular bundle on runners keeps ingot off floor and out of dirt; makes fork-lift handling and storage easier. Paper cover under straps protects against dust.

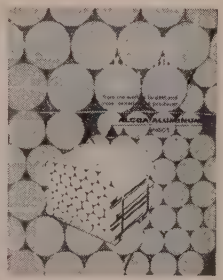
Extruders who use Alcoa® Ingot are in the best position to profit from Alcoa's leadership in research and development. For more information, call your nearest Alcoa sales office.

ALCOA ALUMINUM
INGOT

Alcoa Aluminum Ingot is refined, clean, pure, sound, uniform and customized

•

FREE ALCOA EXTRUSION INGOT BOOKLET! SEND TODAY!



Aluminum Company of America, 860-K Alcoa Building, Pittsburgh 19, Pa.
Please send free booklet on Alcoa Aluminum Extrusion Alloy Ingot.

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Company_____

Address_____

City_____ Zone____ State_____

Entertainment at Its Best . . . **ALCOA PREMIERE**
with Fred Astaire as Host . . . Tuesday Evenings, **ABC-TV**

Carbon Pitch in New Form Aids Aluminum Producers

Carbon pitch, obtained in the distillation of coal tar and extruded to a new shape, is helping solve problems for aluminum producers in western U. S. It was previously sold to aluminum producers in conglomerate tonnage, which included various sizes from chunks to dust, to make carbon electrodes which are essential to the electrolytic process by which aluminum is made. About three-tenths pound of electrode is used per pound of aluminum.

Because carbon pitch, as previously shipped, presented the aluminum industry with problems of uniform melting and cleanliness, the Tar Products Division of Koppers Co., Inc. has installed at its Fontana, Calif. plant special machinery which uniformly extrudes the pitch into sticks approximately the size of pencils. Hence the designation of the material as "pencil pitch".

The new equipment takes hot, fluid carbon pitch from the plant's distilling operations, extrudes it through pencil-size holes in a specially-built tank, and then cools it rapidly to the hardening point. The equipment is automatic and the finished pencils are deposited directly into gondola cars on an adjacent sidetrack.

Magnesium Had Good Month in August

Production and shipment of magnesium ingot and wrought magnesium shipments showed good gains in August. After a two-year low in July, ingot had a 114% gain with shipments totaling 4870 tons in August. Ingot production continued to climb, reaching 3930 tons, up 7% from July's 3675 tons.

August shipments of wrought magnesium totaled 1160 tons, the highest monthly figure since April, 1957, and 33% above July shipments of 871 tons. The eight-month total topped the 1960 period.

Small Trees Provide New Wall Deco

Something new in Christmas h
decor is the "half-tree," a small
num tree that can be hung on a d
wall, perhaps in groups, and then
down and disassembled for storag
til the next year.

Manufactured by Metal Trees
1511 W. 38th St., Chicago, the ha
trees are being sold through mo
tail outlets in two sizes and variou
ors. The "Holiday" comes as a
tree with 16 natural aluminum co
branches, or in the 2½-foot size w
branches. The "Continental" is a

magnesium

the nation's only fully integrated magnesium plant

n tree in silver-toned gold, red, ink, ice-blue, fuchsia or royal ggested retail prices range from r the 2-foot "Holiday" to $2.98 'Continental."

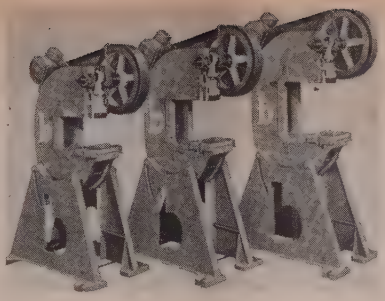
nal consumer acceptance of alu- Chirstmas trees has grown phe- lly in the past three years. In pproximately 10,000 aluminum re sold in the U. S. Last year nber increased to nearly 2,000,- l this year it is expected to soar ,000 trees.

new hanging wall or door tree mportant advantage for retailers it can be sold as a single deco- in quantity for a grouping or as nion item to other types of trees naments.

Dedicates Beryllium Plant

n Beryllium Co., Cleveland, dedi- new fabricating plant earlier nth—just 30 years after the form- f the company, Brush president fikhalapov pointed out.

new plant will employ more ie entire company did six years e said. He also said that the com- Elmore, Ohio, plant expansion, finished, would complete a pro- which has doubled Brush's capaci- nas been a $15 million program.



Three 10-Ton Deep Throat Presses Introduced

Benchmaster Mfg. Co., Gardena, Calif. has brought out three deep throat presses with the largest tonnage capac ities of any Benchmaster presses yet built. Rated at 10 tons each, three distinct shut heights are available (bed to slide, stroke down, adjustment up) measuring 7¾, 10¾ and 13¾ inches. Standard strokes are 1¼ inch. Other strokes of 1½, 2, 2½ and 3 inch are available, with corresponding reductions in shut heights. A 5-inch opening exists between columns.

The new presses operate at 180-190 strokes per minute and use ¾ horsepower, 1140 rpm motors. Center of slide to frame (throat depth) is 12 inches in all models. Bed area is 8 x 11 inches. Overall height is 62⅛, 65⅛ and 68⅛ inches respectively.

Brewer Introduces Softop End for Beer Can

New regular and kingsized beer cans which feature aluminum tops for simplified opening have been placed on the market by Burgermeister Brewing Corp. of San Francisco.

The "Softop" containers are the result of lengthy studies by Burgermeister and can suppliers and mark the first use by a Western brewery of an aluminum end on conventional beer cans. They are being marketed in the Oxnard-Santa Barbara and Eureka areas in California, and in the Reno, Nev., region.

"The 'Softop' can has been designed to afford the ultimate in convenience and enjoyment to the consumer," Henry E. Picard, president of Burgermeister Brewing Corp. said. "We feel that an aluminum end is a realistic step in the continual development of the beer can."

Aluminum—supplied by Kaiser Aluminum & Chemical Sales, Inc.—for the can's end greatly simplifies opening with regular openers as compared to cans with conventional tops.

Burgermeister has redesigned its six-pack cartons specifically for the new cans, with imprinting on the cartons pointing out the easy-opening features. Each can's aluminum end also has printing to highlight the convenient opening characteristics.

EXTRUSIONS only!

voted exclusively to magnesium

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STANDARD MAGNESIUM SALES COMPANY

7570 East 41st Street • Tulsa, Okla. • NA. 7-0100

New Dairy Truck Has Bigger Pay Load

The first refrigerated truck body for the dairy industry constructed of load-bearing aluminum panels with expanded polystyrene foam cores has been introduced by DeKalb Commercial Body Corp., Chicago. The new "DeKalb Dawnliner" body eliminates approximately 1,000 pounds of weight on the average dairy truck — the equivalent of an additional 20 cases of milk in payload.

A new interlocking system which eliminates "through metal" contact when the panels are assembled reduces air leakage and heat transfer for more efficient refrigeration. Interior wall condensation is eliminated.

Because of the lightweight aluminum panel construction, in many cases a lighter G.V.W. rating chassis can be used, saving dairies initial chassis investment as well as license fees and wear and tear on the chassis.

The complete use of aluminum outside and inside the truck body payload area assures a minimum of maintenance since aluminum will not rust or rot. The aluminum is supplied by Reynolds Metals Co.

The panels are a sandwich of expanded polystyrene insulation laminated

to aluminum sheets. Structural mem and panels are coated with an e resin and "laid up" to form a integral panel section. The lamin and curing process is completed in presses.

The separate panel sections are to replace in the event of damage the construction makes it possib transfer the body to a new chassis necessary.

Alcoa Introduces Four New Alloys

Four new products for the extr industry—a new variety of extrusio loy 6063, and three additional previously unavailable in ingot fo are now commercially available Aluminum Co. of America.

"These exclusive Alcoa develop are the result of the company's to supply extruders with product lored precisely to their indiv needs," said R. T. Ferguson, A technical manager of ingot sales.

The new products as describe Alcoa are:

Extrusion alloy C914. A new ve of standard extrusion alloy 6063, it vides a better combination of mec cal properties and extrusion speed can be used in producing the full r of hollow and solid shapes. Its sp advantage is for applications whe matte finish is desired. Receptiv hard anodic coatings, alloy C914 is ticularly good for producing a range of hues, including shade bronze, black and gray.

Extrusion alloy C58. This alloy pecially suited for extrusions to be celain-enameled. Use of C58 great creases the consistency of the adh of porcelain enamels.

Alloy 6563. Now available in form, alloy 6563 previously was o by Alcoa only in extruded shap is capable of being anodized to s ceptibly brighter, more uniform, tive finish than other moderate-str extrusion alloys, and is excellen many trim applications where sp finish is desired.

Alloy 4543. Used to make archit al extrusions requiring a gray 4543 alloy ingots are offered fo first time. There are three versi to produce, respectively, light, me or dark gray finishes, when anodiz the Alumilite process.

REDUCE

FORMING

COSTS

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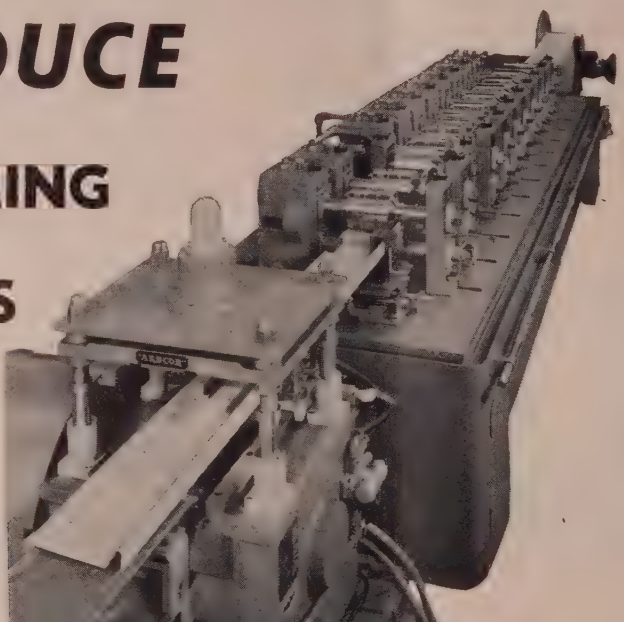

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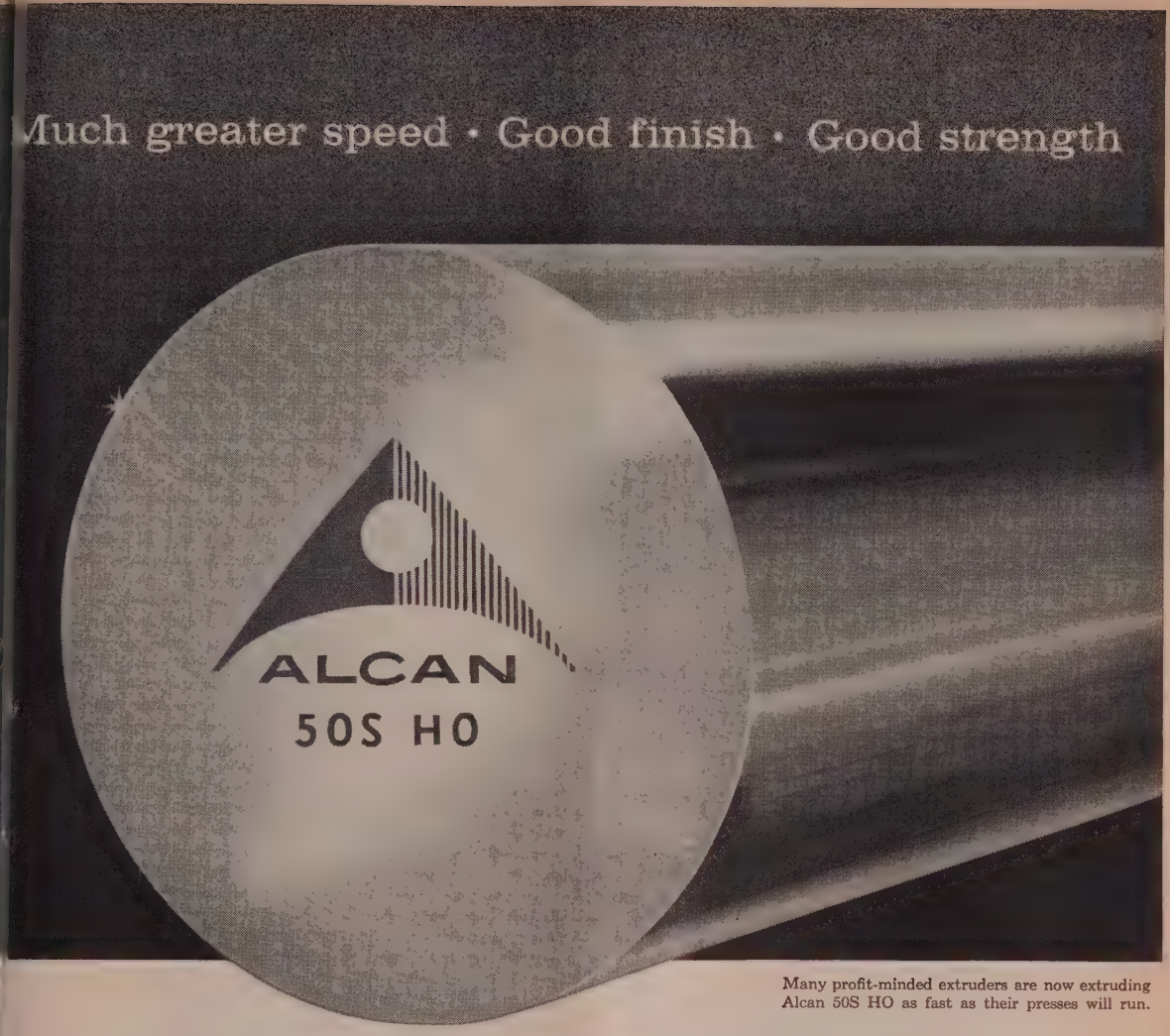

Many profit-minded extruders are now extruding Alcan 50S HO as fast as their presses will run.

Here in one aluminum ingot...

much greater extrusion speed... plus good finish and strength

EN you run Alcan 50S HO you get greater production . . . day and per machine-hour . . . while still maintaining good hanical properties and finish.

hat sums up the experience of many fabricators now using much-improved version of the long-time favorite Alcan . They're unanimously enthused about its increased press ed . . . *up to maximum press capacity.*

Because of the all-around performance of Alcan 50S HO, re is no longer any necessity for stocking a large variety of ingot products. This one ingot takes care of the majority of product runs. Alcan 50S HO Ingot can reduce your inventory as much as 60%.

Alcan of course supplies other types of extrusion ingot to meet special job requirements.

Run 50S HO on your own equipment . . . and clock your production on the run-out table.

For further information on Alcan 50S HO, write or phone your nearest Aluminium Limited Sales Office.

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luction at our Jackson
chigan) Plant.

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l stock, and plate are now
lable in a broad range of
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acity from 1,700 to 13,200
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DOW
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Aluminum Prime Door Installed Like Standard Wood Door

A new aluminum prime door, announced by Hess Manufacturing Co., Quincy, Pa., promises to open new profit horizons for home improvment contractors. Called the Quincy Armaclad, it combines the best and desired features of aluminum and wood in the one door. The door shown is a 1¾-inch jalousie model.

The doors are recommended for use wherever one desires the beauty and lasting qualities of aluminum without the need for special tools, handling, or frame construction for installation. The secret of the door is a heart or core of wood, concealed by an aluminum outerskin.

Armaclad doors are installed in the same manner as any standard wood door. They're hung in the existing door frame – there is no need for special or secondary door jambs as with ordinary aluminum doors.

Installation requires neither special skills nor special tools (lower left picture). Standard woodworking tools are all that are needed to fit and hang the new doors. They may be sawed, planed, or bored.

Once the door has been fitted and hinged, an aluminum cap is placed over the edges of the door (upper left picture). It is bonded permanently with the use of Armaclad contact adhesive. Since the faces of the door are already aluminum, the cap covers the small exposed portion of the core to make a complete aluminum surface.

The doors are available as jalousie rims, complete jalousie doors, one-light, self-storing, screen, and flush doors. In addition to the residential market, the doors are most suited for use in store fronts, institutions, public buildings.

New Boats To Bid For 1962 Pleasure Budgets

New lapstrake utility and runabout models are being introduced by Feather Craft Inc., 450 Bishop St., N.W., Atlanta Ga. Another year of increased sales in aluminum boats is forecast by this veteran manufacturer, with "bread and butter" low cost model sales continuing strong and with renewed public acceptance of restyled aluminum runabouts.

Feather Craft commissioned top-ranking engineer-stylist Alexis de Sakhnoffsky to go to work on this line. Colonel Sakhnoffsky's futuristic concepts and techniques have touched many and varied products, including automobiles, boats, marine hardware, wearing apparel, kitchen utensils, streamlined buses, etc.

Many new features dot the new Feather Craft line. There's an 86-pound round-bottom Cartopper at $169. This boat has an .050-inch-thick skin, trikeels and sprayrails, carrying handles, full-measure flotation requirement, abundant transverse ribbing, and seat-to-bottom bulkheads.

Added to the popular semi-V Scamp for stream and pond fisherman's easy portability is another 10-foot pram double-ender Punt at $95.

1960 Scrap Recovery, Smelters' Sales Down from 1959

Aluminum scrap recovery in 1960, as reported by consumers to the Bureau of Mines, totaled 329,000 tons. Recovery from new scrap declined 5% to 266,000 tons and recovery from old scrap dropped to 63,000 tons, 20% below the preceding year. Recovery of secondary aluminum alloys (all constituents) from 441,000 tons of aluminum scrap reported processed in 1960 totaled 353,000 tons, a decline of 9% compared with 1959. An additional 1,350 tons of aluminum was recovered from copper-base, zinc-base, and magnesium-base scrap.

The value of 329,260 tons of aluminum recovered from processed scrap was $171.2 million computed from the average primary aluminum price of 26 cents per pound.

The Bureau estimated that full coverage of the industry during 1960 would show a total scrap consumption of 523,000 tons and secondary ingot production of 329,000 tons. Calculated aluminum recovery based on full coverage would total 407,000 tons and metallic aluminum alloy recovery would total 438,000 tons.

Shipments of aluminum alloys by secondary smelters in 1960 totaled 280,000 tons, a decline of 17% compa with 1959, but 16% above the shipments. In comparison with shipments of Al-Si-Cu-Ni alloys down 7,548 tons or 33%. No. 319 variations down 6,744 tons or 16% AXS 679 and variations were off 18 tons or 14%. Contrary to the tr pure aluminum, 97% minimum, and Zn alloys showed increases over 19

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Men-on-the-move

William R. Bayer, secretary, treas and director of Apex Smelting Chicago, has been named president the company's wholly-owned subsidi Apex Smelting Co. (California).

Comalco Industries Pty. Ltd., bourne, Australia, has appointed **M. Mawby** chairman of the board. Coma is the parent company in the alumin complex set up by Kaiser Alumin and Consolidated Zinc Corp.

Joseph C. Lowey has been nam manager of the Metal Industries Di of The Diversey Corp., 212 W. Mon St., Chicago 6.

Doehler-Jarvis Div'n of National L Co. has named **Kenneth F. Koegler** sistant to the Div'n manager. He been plant manager at Plant 2 si 1955. The Division also appointed **Jo W. Thees** plant manager of Plant Thees had been production manage

Florida Industries Inc., Tampa, F manufacturers of aluminum build products and roll forming machin has named **Drummond R. Stuart** sa manager. **Edwin Schmidt** is new prod tion chief.

Peter A. Frasse & Co., Inc., 17 Gra St., New York 13, steel and alumin distributor, has made the following pointments: **N. L. Hammond, Jr.** to trict manager, succeeding Bernard lan, resigned; Harvey O. Smith to trict manager, succeeding Hammo and **Alfred E. DeMayo** to district m ager, Buffalo, succeeding Smith.

Edward S. Bunn has been elected v president of Revere Copper & Br Inc., in charge of research and devel ment. He succeeds Richard A. Wilk who has retired under Revere's ret ment plan. Bunn has been a resea metallurgist with Revere since 1932

Last month, Revere announced pointment of **F. C. Hyde, Jr.,** as gene sales manager. Hyde is vice presid and formerly assistant general sales m ager. He succeeds **Raymond P. Winb** who has been appointed vice presid of foreign operations.

Bertram S. Parker has been elec president of The Youngstown Foun & Machine Co., Youngstown, Ohio. succeeds **B. G. Parker,** who was elec chairman of the board.

Where to buy METALWORKING

MATERIALS • EQUIPMENT • SERVICES

buyers guide is published for light metals fabricators and product manufacturers require materials, equipment and services for nonferrous metalworking. The firms d are current advertisers in Modern Metals, and constitute major supply sources.

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ago 12, Ill.
port Brass Company
rand St.
geport 2, Connecticut
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land, Michigan (Al&Mg)
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enport, Iowa (Al)
luminum
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senville, Ill.
lds Metals Company
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hmond 18, Va.
Manufacturing Co.
Mill Street
terbury, Connecticut
ern Extrusions Company
th Washington Street
gnolia, Arkansas (Al)
ior Industries, Inc.
6 Oakwood Ave.
ngstown, Ohio

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lsa, Okla.

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ngstown, Ohio
inum Co. of America
7 Alcoa Building
tsburgh 19, Pa.
inum & Magnesium, Inc.
dusky, Ohio
onda Aluminum Co.
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uisville 1, Ky.
Smelting Company
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icago 12, Illinois
ey Aluminum
rrance, Calif.

Kaiser Aluminum & Chemical Sales
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Oakland 12, Calif.

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New York 22, N. Y.

Reynolds Metals Company
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Richmond 18, Va.

Wolverine Tube Div.
Calumet & Hecla, Inc.
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Allen Park, Mich.

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Standard Magnesium Sales Co.
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EXTRUSIONS, ZIRCONIUM

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Southern Screw Company
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Baltimore 5, Md.

Amchem Products, Inc.
Ambler 12, Pennsylvania

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Diversey Corp.
212 W. Monroe St.
Chicago 6, Ill.

Frederick Gumm Chemical Co.
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Kearny, N. J.

Heatbath Corp.
Springfield 1, Mass.

Macco Products Co.
9220 S. Sangamon St.
Chicago 20, Ill.

MacDermid Inc.
526 Huntingdon Ave.
Waterbury 20, Conn.

Magnus Chemical Co., Inc.
69 South Ave.
Garwood, N. J.

Northwest Chemical Co.
9310 Roselawn Ave.
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Oakite Products, Inc.
50A Rector St.
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Parker Rust Proof Co.
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Detroit 11, Mich.

Pennsalt Chemicals Corp.
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Philadelphia 2, Pa.

Pittsburgh Plate Glass Co.
Industrial Paint Div'n
1 Gateway Center
Pittsburgh, Pa.

Virginia-Carolina Chemical Corp.
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Richmond 8, Va.

FLUX, MAGNESIUM

Standard Magnesium Sales Co.
7570 E. 41st St.
Tulsa, Okla.

FLUXES, MELTING

Alloys & Chemicals Corp.
4365 Bradley Road, S. W.
Cleveland 9, Ohio

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Aluminum & Magnesium, Inc.
Sandusky, Ohio

Apex Smelting Company
2537 West Taylor Street
Chicago 12, Illinois

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

Park Chemical Co.
8074 Military Ave.
Detroit 4, Mich.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

FLUX, SOLDERING, BRAZING, WELDING

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

FOIL, ALUMINUM

Aluminum Co. of America
1277 Alcoa Building
Pittsburgh 19, Pa.

Anaconda Aluminum Co.
P.O. Box 1654
Louisville 1, Ky.

Consolidated Aluminum Corp.
Jackson, Tenn.

Kaiser Aluminum & Chemical Sale
Kaiser Center
Oakland 12, Calif.

Reynolds Metals Company
6601 West Broad St.
Richmond 18, Va.

FOIL, ALUMINUM, ANODIZED

Coil Anodizers, Inc.
1250 Keating Ave.
Muskegon, Mich.

FORGING COMPOUNDS

Fiske Bros. Refining Co.
129 Lockwood St.
Newark 5, N. J.

The Hodson Corp.
5301 W. 66th St.
Chicago 38, Ill.

Kerns United Corp.
2659 E. 95th St.
Chicago 17, Ill.

FORGINGS, ALUMINUM

Aluminium Limited Sales, Inc.
630 Fifth Avenue
New York 20, New York

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Bridgeport Brass Company
30 Grand St.
Bridgeport 2, Conn. (Al, Ti)

Harvey Aluminum
Torrance, Calif.

Kaiser Aluminum & Chemical Sale
Kaiser Center
Oakland 12, Calif.

Scovill Manufacturing Co.
99 Mill St.
Waterbury, Conn.

FORGINGS, EXTRUSION, TOOL

Ajax Steel & Forge Co.
205 Adair St.
Detroit 7, Mich.

FORGINGS, IMPACT

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Bridgeport Brass Co.
30 Grand St.
Bridgeport 2, Conn.

Harvey Aluminum
Torrance, Calif.

Scovill Mfg. Co.
99 Mill St.
Waterbury, Conn.

FORGINGS, MAGNESIUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Bridgeport Brass Co.
30 Grand St.
Bridgeport 2, Conn.

Harvey Aluminum
Torrance, Calif.

FRIT, PORCELAIN ENAMEL

Ferro Corp.
4150 E. 56th St.
Cleveland 5, Ohio

GALLIUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

A.I.A.G. Metals, Inc.
9 Rockefeller Plaza
New York 20, N. Y.

HARDWARE, DOOR, WINDOW

Cipco Corporation
22nd & Cole Street
St. Louis 6, Mo.

HEAT TREATING SALTS, ALUMINUM

Heatbath Corp.
Springfield 1, Mass.

Park Chemical Co.
8074 Military Ave.
Detroit 4, Mich.

HIGH PURITY ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Consolidated Aluminum Corp.
Jackson, Tenn.

Kaiser Aluminum & Chemical Co
Kaiser Center
Oakland 12, Calif.

HIGH PURITY MAGNESIUM

Dominion Magnesium Ltd.
320 Bay St.
Toronto, Ont.

ALUMINUM (ALLOYS)

Chemicals Corp.
radley Road, S. W.
nd 9, Ohio

m Limited Sales, Inc.
fth Avenue
ork 20, New York

m & Magnesium, Inc.
sky, Ohio

m Co. of America
Alcoa Building
rgh 19, Pa.

la Aluminum Co.
Box 1654
ville 1, Ky.

nelting Company
West Taylor Street
go 12, Illinois

Aluminum
nce, Calif.

F. Jobbins, Inc.
Box 230
a, Ill.

Aluminum & Chemical Sales
r Center
nd 12, Calif.

uminum
Park Ave.
York 22, N. Y.

ls Metals Company
W. Broad St.
mond 18, Va.

, MAGNESIUM (ALLOYS)

melting Company
West Taylor Street
go 12, Illinois

ion Magnesium Limited
Bay St.
nto, Ont.

ow Chemical Co.
ls Dept.
and, Mich.

rd Magnesium Sales Co.
E. 41st St.
a, Okla.

ATION PIPE, ALUMINUM

num Co. of America
Alcoa Building
burgh 19, Pa.

l Extrusions, Inc.
Lake Park Road
gstown, Ohio

Aluminum
rance, Calif.

r Engineering Co.
Columbia Ave.
rside, Calif.

Aluminum & Chemical Sales
er Center
land 12, Calif.

Aluminum
Park Ave.
York 22, N. Y.

olds Metals Company
1 W. Broad St.
hmond 18, Va.

ICANTS: EXTRUDING, STING, FORMING

Brothers Refining Co.
K Lockwood St.
wark 5, N. J.

Colloids Corp.
Wilkes Place
ron, Pa.

hite Products Corp.
okfield, Ohio

Hodson Corp.
01 W. 66th St.
icago 38, Ill.

s United Corp.
59 E. 95th St.
icago, Ill.

o Products Co.
20 S. Sangamon St.
icago 20, Ill.

Dermid Inc.
5 Huntingdon Ave.
aterbury 20, Conn.

ius Chemical Co., Inc.
South Ave.
rwood, N. J.

hwest Chemical Co.
10 Roselawn Ave.
troit 4, Mich.

te Products, Inc.
0A Rector St.
w York 6, New York

er Rust Proof Co.
77 E. Milwaukee Ave.
troit 11, Mich.

nsalt Chemicals Corp.
hree Penn Center
iladelphia 2, Pa.

MAGNESIUM ANODES

Standard Magnesium Sales Co.
7570 E. 41st St.
Tulsa, Okla.

MAINTENANCE MATERIALS, PAINT SPRAY BOOTH

The Diversey Corp.
212 W. Monroe St.
Chicago 6, Ill.

Kerns United Corp.
2659 E. 95th St.
Chicago 17, Ill.

MacDermid Inc.
526 Huntingdon Ave.
Waterbury 20, Conn.

Northwest Chemical Co.
9310 Roselawn Ave.
Detroit 4, Mich.

Oakite Products, Inc.
50A Rector St.
New York 6, N. Y.

Pennsalt Chemicals Corp.
Three Penn Center
Philadelphia 2, Pa.

Wyandotte Chemicals Corp.
J. B. Ford Div'n
Wyandotte, Mich.

NAILS, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Nichols Wire & Aluminum Co.
Davenport, Iowa

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pa.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

NUTS

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

PANELS, ANODIZED

Scovill Mfg. Co.
99 Mill St.
Waterbury, Conn.

PIPE, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

The Dow Metal Products Co.
Div'n Dow Chemical Co.
Midland, Mich.

General Extrusions, Inc.
4040 Lake Park Road
Youngstown, Ohio

Harvey Aluminum
Torrance, Calif.

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

Olin Aluminum
400 Park Ave.
New York 22, N. Y.

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pa.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

C. A. Roberts Co.
2401 25th Ave.
Franklin Park, Ill.

Wolverine Tube Div.
Calumet & Hecla, Inc.
17262 Southfield Rd.
Allen Park, Mich.

PIPE FITTINGS

C. A. Roberts Co.
2401 25th Ave.
Franklin Park, Ill.

PLASTIC CAPS, INSERTS

Impex Corp.
4049 Simon Road
Youngstown 12, Ohio

PLASTIC, RESIN

Union Carbide Plastics Co.
Div'n of Union Carbide Corp.
270 Park Ave.
New York 17, N. Y.

PLATE, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Anaconda Aluminum Co.
P. O. Box 1654
Louisville 1, Ky.

The Dow Metal Products Co.
Div'n, The Dow Chemical Co.
Midland, Mich.

Fairmont Aluminum Company
Fairmont, West Virginia

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

Nichols Wire & Aluminum Co.
Rockingham Road
Davenport, Iowa

Olin Aluminum
400 Park Avenue
New York 22, New York

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

PLATE, MAGNESIUM

Brooks & Perkins, Inc.
1950 W. Fort St.
Detroit 16, Mich.

The Dow Metal Products Co.
Div'n, Dow Chemical Co.
Midland, Michigan

POLISHING, BUFFING COMPOUNDS

Frederick Gumm Chemical Co., Inc.
538 Forest St.
Kearny, N. J.

POLISHING, CHEMICAL

Alchemize Corporation
621 South Kolmar
Chicago 24, Illinois

Allied Research Products, Inc.
4004 East Monument St.
Baltimore 5, Md.

Conversion Chemical Corp.
99 E. Main St.
Rockville, Conn.

Frederick Gumm Chemical Co., Inc.
538 Forest St.
Kearny, N. J.

Heatbath Corp.
Springfield 1, Mass.

MacDermid Inc.
526 Huntingdon Ave.
Waterbury 20, Conn.

Virginia-Carolina Chemical Corp.
431 E. Main St.
Richmond 8, Va.

PRE-PAINTED SHEET & COIL

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Bridgeport Brass Co.
30 Grand St.
Bridgeport 2, Conn.

Consolidated General Products, Inc.
P. O Box 7425
Houston 8, Tex.

Enameled Steel & Sign Co.
4658 W. Addison St.
Chicago 41, Ill.

Fairmont Aluminum Co.
Fairmont, West Virginia

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Metal Finishers, Inc.
78 S. Franklintown Road
Baltimore 23, Md.

Olin Aluminum
400 Park Ave.
New York 22, N. Y.

Pre Finish Metals Inc.
2110 E. Pratt Blvd.
Elk Grove, Ill.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

Seaway Products
Div'n Globe Industries Inc.
2207 Schrage Ave.
Whiting, Ind.

REFRACTORY PRODUCTS

Harbison-Walker Refractories Co.
Farmers Bank Building
Pittsburgh 22, Pa.

Kaiser Refractories
Kaiser Center
Oakland 12, Calif.

Plibrico Co.
1800 N. Kingsbury St.
Chicago 14, Ill.

Refractory Products Co.
910 Custer Ave.
Evanston, Ill.

RIVETS, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

ROD, BRAZING

Alabama Wire Co., Inc.
P. O. Box 648
Florence, Alabama

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Nichols Wire & Aluminum Co.
Davenport, Iowa

ROD, WELDING

Alabama Wire Co., Inc.
P. O. Box 648
Florence, Alabama

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

The Dow Metal Products Co.
Div'n, Dow Chemical Co.
Midland, Mich.

Fairmont Aluminum Co.
Fairmont, West Virginia

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

Nichols Wire & Aluminum Co.
Davenport, Iowa

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

ROLLING OILS

Fiske Bros. Refining Co.
129 Lockwood St.
Newark 5, N. J.

Kerns United Corp.
2659 E. 95th St.
Chicago 17, Ill.

SCREEN WIRE, ALUMINUM

Alabama Wire Co., Inc.
P. O. Box 648
Florence, Alabama

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Fairmont Aluminum Co.
Fairmont, West Virginia

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

SCREWS, MACHINE, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Southern Screw Company
Statesville, North Carolina

SCREWS, TAPPING, ALUMINUM

Southern Screw Company
Statesville, North Carolina

SCREWS, WOOD, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Southern Screw Company
Statesville, North Carolina

SHAPES, ROLL FORMED

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Nichols Wire & Aluminum Company
Davenport, Iowa

Pfister Aluminum Corp.
50 West Allendale Ave.
Allendale, N. J.

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pennsylvania

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

SHAPES, STRUCTURAL, MAGNESIUM

Standard Magnesium Sales Co.
7570 E. 41st St.
Tulsa, Okla.

SHEET, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Aluminum Mills, Inc.
1660 Deerfield Road
Highland Park, Ill.

Anaconda Aluminum Co.
P. O. Box 1654
Louisville 1, Ky.

Bridgeport Brass Company
30 Grand St.
Bridgeport 2, Conn.

Sheet, Aluminum (cont'd)

Consolidated Aluminum Corp.
Jackson, Tenn.

Consolidated General Products, Inc.
Box 7425
Houston 8, Texas

The Dow Metal Products Co.
Div'n, The Dow Chemical Co.
Midland, Mich.

Fairmont Aluminum Company
Fairmont, West Virginia

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

Nichols Wire & Aluminum Co.
Davenport, Iowa

Olin Aluminum
400 Park Avenue
New York 22, New York

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pa.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

Scovill Manufacturing Co.
99 Mill Street
Waterbury, Conn.

SHEET, ANODIZED

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

City Plating & Polishing Co.
22nd & Cole Street
St. Louis 6, Missouri

Coil Anodizers, Inc.
1250 Keating Ave.
Muskegon, Mich.

Fairmont Aluminum Co.
Fairmont, West Virginia

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pennsylvania

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

Southern Extrusions, Inc.
North Washington Street
Magnolia, Arkansas

SHEET, MAGNESIUM

Brooks & Perkins, Inc.
1950 W. Fort St.
Detroit 16, Mich.

The Dow Metal Products Co.
Div'n, Dow Chemical Co.
Midland, Mich.

SOLDER, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Production Metals, Inc.
299 Pavonia Ave.
Jersey City 2, N. J.

STRIPPERS, METAL & PAINT

Allied Research Products, Inc.
4004 East Monument St.
Baltimore 5, Md.

The Diversey Corp.
212 W. Monroe St.
Chicago 6, Ill.

Frederick Gumm Chemical Co., Inc.
538 Forest St.
Kearny, N. J.

Heatbath Corp.
Springfield 1, Mass.

Kerns United Corp.
2659 E. 95th St.
Chicago 17, Ill.

MacDermid Inc.
526 Huntingdon Ave.
Waterbury 20, Conn.

Magnus Chemical Co., Inc.
69 South Ave.
Garwood, N. J.

Northwest Chemical Co.
9310 Roselawn Ave.
Detroit 4, Mich.

Oakite Products, Inc.
50A Rector St.
New York 6, N. Y.

Pennsalt Chemicals Corp.
Three Penn Center
Philadelphia 2, Pa.

Wyandotte Chemicals Corp.
J. B. Ford Div'n
Wyandotte, Mich.

THORIUM METAL

Dominion Magnesium Limited
320 Bay St.
Toronto, Ont.

TOOLING PLATE, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Reynolds Metals Co.
6601 W. Broad St.
Richmond 18, Va.

TOOLING PLATE, MAGNESIUM

The Dow Metal Products Co.
Div'n, The Dow Chemical Co.
Midland, Mich.

TREAD PLATE, MAGNESIUM

The Dow Metal Products Co.
Div'n, Dow Chemical Co.
Midland, Mich.

TUBED SHEET, ALUMINUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Olin Roll-Bond Division
East Alton, Ill.

Reynolds Metals Co.
6601 W. Broad St.
Richmond 18, Va.

TUBE, ALUMINUM

Aluminium Limited Sales, Inc.
630 Fifth Avenue
New York 20, New York

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

The Dow Metal Products Co.
Div'n, Dow Chemical Co.
Midland, Mich.

General Extrusions, Inc.
4040 Lake Park Road
Youngstown, Ohio

Harvey Aluminum
Torrance, Calif.

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Kaiser Aluminum & Chemical Sales
Kaiser Center
Oakland 12, Calif.

LaPointe Industries Inc.
Rockville, Conn.

Olin Aluminum
400 Park Avenue
New York 22, New York

Pfister Aluminum Corp.
50 West Allendale Ave.
Allendale, N. J.

Quaker State Metals Co.
Manheim Pike at 230 Bypass
Lancaster, Pennsylvania

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

Southern Extrusions Company
North Washington Street
Magnolia, Arkansas

Wolverine Tube Div.
Calumet & Hecla, Inc.
17262 Southfield Rd.
Allen Park, Mich.

TUBE, MAGNESIUM

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

The Dow Metal Products Co.
Div. Dow Chemical Co.
Midland, Mich.

Standard Magnesium Sales Co.
7570 E. 41st St.
Tulsa, Okla.

TUBE, TITANIUM

Wolverine Tube Div'n
Calumet & Hecla, Inc.
Dept. N, 17262 Southfield Road
Allen Park, Mich.

TUBE, ZIRCONIUM

Harvey Aluminum
Torrance, Calif.

Wolverine Tube
Div. Calumet & Hecla Inc.
17200 Southfield Rd.
Allen Park, Mich.

VENETIAN BLIND STOCK

Bridgeport Brass Co.
30 Grand St.
Bridgeport 2, Conn.

Consolidated General Products
P. O Box 7425
Houston 8, Tex.

Fairmont Aluminum Co.
Fairmont, West Virginia

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

VINYL RESINS

Union Carbide Plastics Div'n
270 Park Ave.
New York 17, N. Y.

WIRE, ALUMINUM

Alabama Wire Co., Inc.
P. O. Box 648
Florence, Alabama

Aluminium Limited Sales, Inc.
630 Fifth Ave,
New York 20, New York

Aluminum Co. of America
1227 Alcoa Building
Pittsburgh 19, Pa.

Bridgeport Brass Company
30 Grand St.
Bridgeport 2, Conn.

Fairmont Aluminum Co.
Fairmont, West Virginia

Nichols Wire & Aluminum Co.
Davenport, Iowa

Olin Aluminum
400 Park Ave.
New York 22, N. Y.

Reynolds Metals Company
6601 W. Broad St.
Richmond 18, Va.

WIRE, MAGNESIUM

Standard Magnesium Sales Co.
7570 E. 41st St.
Tulsa, Okla.

ZIRCONIUM: INGOT, PLATE, ROD AND BAR, SHEET

Harvey Aluminum
Torrance, Calif.

EQUIPMENT

ALLOY TESTING INSTRUMENTS

Schuco Scientific Div'n
Schueler & Co.
75 Cliff St.
New York 38, N. Y.

ANODIZING EQUIPMENT

Allied Research Products, Inc.
4004 E. Monument St.
Baltimore 5, Md.

DISTRIBUTORS AND JOBBERS

These firms warehouse most forms of aluminum—sheet, coil, rod, tube, extrusions, etc.—and are located in all major industrial areas.

Aluminum Mill Supply Corp.
42-44 Court St.
Brooklyn 1, N. Y.

Atlantic Aluminum & Metal Distributors, Inc.
Page Boulevard
Springfield, Massachusetts

A. M. Castle & Co.
3400 N. Wolf Road
Franklin Park, Ill.

Peter A. Frasse and Company
17 Grand Street
New York, N. Y.

General Materials Co.
1400 Plaza Ave.
New Hyde Park, N. Y.

Kilsby-Tubesupply
2501 S. Malt Ave.
Los Angeles 22, Calif.

A. B. Murray Co., Inc.
P. O. Box 476
Elizabeth, N. J.

Production Metals, Inc.
299 Pavonia Ave.
Jersey City 2, N. J.

Reynolds Aluminum Supply Co.
573 W. Peachtree Street, N.E.
Atlanta, Georgia

C. A. Roberts Co.
2401 25th Ave.
Franklin Park. Ill.

Servi-Sure Mfg. Co.
131 N. Green St.
Chicago 7, Ill.

The Gilbert Tramer Co.
1217 Main
Cleveland, Ohio

BARREL FINISHING EQUIPME

Allied Research Products Inc.
4004 E. Monument St.
Baltimore 5, Md.

Sutton Engineering Co.
First National Bank Bldg.
Pittsburgh 22, Pa.

BEARINGS

Mesta Machine Co.
P. O. Box 1466
Pittsburgh 30, Pa.

Morgan Construction Co.
Worcester, Mass.

BILLET CUTTERS

Loma Machine Manufacturing
114 East 32nd Street
New York 16, New York

Ty-Sa-Man Machine Co.
820 White Ave.
Knoxville, Tenn.

BILLET HEATERS

Ajax-Magnethermic Corp.
3990 Simon Road
Youngstown 7, Ohio

The Carl Mayer Corporation
20800 Center Ridge Rd.
Cleveland 16, Ohio

Granco, Inc.
317 32nd St., S.W.
Grand Rapids 8, Mich.

The Lanly Company
2800 Euclid Ave.
Cleveland 15, Ohio

Lindberg Engineering Co.
2446 W. Hubbard St.
Chicago 12, Ill.

Morrison Engineering Corp.
P. O. Box 4345
Cleveland 32, Ohio

W. S. Rockwell Co., Inc.
2060 Eliot Street
Fairfield, Conn.

Sunbeam Equipment Corp.
180 Mercer St.
Meadville, Pa.

Warwick Industrial Furnace & Engineering Corp.
452 W. Chicago Ave.
Chicago 10, Ill.

BUFFING & POLISHING EQUIPMENT

The Gilbert Tramer Co.
1217 Main Ave.
Cleveland 13, Ohio

BURNERS, OIL, GAS

E. W. Bliss Company
Canton 10, Ohio

CASTING EQUIPMENT, BILL

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Lobeck Casting Processes Inc.
114 E. 32nd St.
New York 16, N. Y.

Morrison Engineering Corp.
P. O. Box 4345
Cleveland 32. Ohio

Permanent Mold Die Co., Inc.
2275 E. Nine Mile Road
Hazel Park, Mich.

CASTING MACHINES, CONTINUOUS

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

Lobeck Casting Processes, Inc.
114 E. 32nd St.
New York 16, N. Y.

COATING THICKNESS TESTE

Unit Process Assemblies, Inc.
53-15 37th Ave.
Woodside 77, New York, N.

COATING LINES, STRIP

Gasway Corp.
6463 N. Ravenswood Ave.
Chicago 26, Ill.

Hunter Engineering Co.
1495 Columbia Ave.
Riverside, Calif.

J. O. Ross Engineering Co.
2nd Ave.
Highland Park, N. J.

NDLING EQUIPMENT

gineering Inc.
. Lake St.
7, Ill.

. Machine Works Inc.
. Belmont Ave.
41, Ill.

AW EQUIPMENT

Laubscher Corp.
57th St.
rk 19, N. Y.

chine Mfg. Co., Inc.
32nd St.
rk 16, N. Y.

AWING MACHINE, NUOUS

Laubscher Corp.
57th St.
rk 19, N. Y.

S MACHINES, WIRE

lachine Tool Inc.
eline St.
aven, Conn.

MACHINES

Roller Die Corp.
Clayton Avenue
fe, Ohio

n Machine Works Inc.
7. Belmont Ave.
o 41, Ill.

ndustries, Inc.
Box 15171
, Fla.

achine Mfg. Co., Inc.
32nd St.
ork 16, N. Y.

Roll Form, Inc.
lubbell
28, Mich.

achinery Company
th Street, N.W.
Rapids 2, Michigan

t Abrasive Machine Div'n
Pipe Tools, Inc.
n, Ohio

an Machine Co.
hite Ave.
ille, Tenn.

er Company
Walworth Ave.
and 2, Ohio

TING MACHINES

-Lima-Hamilton Corp.
rial Equipment Div'n
elphia 42, Pa.

gineering Co.
mpire Building
urgh 22, Pa.

achine Mfg. Co., Inc.
32nd St.
ork 16, N. Y.

ngineering Co.
National Bank Bldg.
urgh 22, Pa.

Stillman Press Div.
l-Birmingham Co., Inc.
lossom Road
ster 10, N. Y.

STING MACHINES

Machinery Co.
Greenlee Bros. & Co.
7. Eighth St.
nd, Mich.

achine Co.
N. Ridge Ave.
go 26, Ill.

ATERS

versey Corp.
V. Monroe St.
go 6, Ill.

rl Mayer Corp.
Center Ridge Rd.
land 16, Ohio

Hendry Co., Inc.
N. Elston Ave.
go 22, Ill.

nly Co.
Euclid Ave.
land 15, Ohio

g Engineering Co.
W. Hubbard St.
go 12, Ill.

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ooking Ahead

opening skirmish of what could well become a war of metals flared briefly in the primary aluminum industry late last month. The repercussions spread quickly through other sectors of the nonferrous industry, and even rippled through the already-nervous steel business. Other basic industries — plastics, wood, concrete — found themselves too close to the fray for comfort.

smoke hasn't cleared completely, but the outlines of the picture are beginning to emerge distinctly enough to speculate on the course, if not the outcome, of the struggle ahead. So we let our imagination run wild while planning this month's front cover — a hypothetical front page, headlining some of the possible, if improbable, metal developments of 1962.

if none of our make-believe headlines pan out, we believe the recent round of price reductions in aluminum signals the beginning of a new era for the industry. Not because of the price cuts themselves, but because of the reasons for them and the manner in which they occurred. We believe that aluminum is on the threshold of becoming a true mass production material; that bulk selling of the metal is not far around the corner; that a world-wide price structure will put an end to separate regional prices.

inium Limited started it September 20, when it dispatched letters to its U. S. customers, offering them the choice of buying Canadian metal either at the U. S. book price of 26 cents a pound, or at the Canadian price (22.55 cents in U.S. currency), plus the 1.25-cent U. S. duty and freight and handling charges. This meant an effective price of 23.80 cents at the Canadian border. A customer located fairly close to the border might pay an additional 2 mills for handling and shipping, so his cost would be 2 cents under the going book price. Customers in the Southwest might pay 2 cents for handling and shipping, but they would still be under the book price.

a quickly announced a reduction of 2 cents a pound on ingot. This brought the book price down to 24 cents and restored the traditional single-delivered-price concept.

is price reduction is forced upon us," explained Alcoa board chairman Frank Magee, referring to not only the discriminatory nature of the Limited scheme, but also to cut-rate imports from "certain European sources." Alcoa, he said, made the reduction with "great reluctance in view of the fact that the (previous) 26-cent price yielded only a modest return on existing volume. . . ."

The lower price was needed by independent fabricators although many of them had been living on 24-cent metal for several months. (In fact, the reduction simply brought book prices in line with actual market prices in many cases. This is probably one of the reasons for Aluminium Limited's action.)

But if fabricators cherished the hope that price reductions would stop at the ingot level, they were in for a disappointment. Extruders may have been encouraged by a slight shaving of the billet price to 25.5 cents (it was less than it appeared to be because the cent-a-pound scrap credit was also abolished).

The full significance of the upheaval became apparent the next day, when Alcoa announced new prices for mill products. One cent a pound was trimmed off the price of products comprising up to 70% sheet and plate volume; some tube products and hard alloy extruded shapes were dropped 2 cents; plain coiled foil was chopped 1.5 cents; and some of the common casting alloys were shaved 0.7 to 0.9 cents. (Understandably, there was no reduction in can stock. Just a few months earlier, it had been cut to a slim 2 cents above the ingot price — an effort to hold whatever advantage aluminum had gained over tinplate in such major canning markets as citrus concentrates.)

The new prices, said an Alcoa spokesman, were a "painful recognition of market conditions" in the aluminum industry. "It is conceivable that some of these list price reductions will be to the levels at which the products have actually been selling."

The stock market reacted quickly. The last week of September started with a wave of scare selling that knocked the aluminums—already well below their highs for the year — to new lows for 1961. In fact, the entire market suffered its sharpest loss in more than a year.

Trigger-happy analysts, apparently ignoring the 4-week decline of the market as a whole, were quick to pin the blame on the aluminums. It was pointed out that the aluminum industry's woes mirrored the problems facing many other industries — stiff foreign and domestic competition, over-abundant capacity, weakening price structures.

Investors who quickly dumped their aluminum shares may have reasoned that the price cut would lop 2 cents off the profit on every pound of aluminum sold; that the earnings of the producers would dwindle to the vanishing point.

Simple arithmetic would seem to support this reasoning. Two cents a pound adds up to $40 a ton. If primary shipments total 2 million tons, the 2-cent price cut should chop $80 million off the industry's dollar volume.

(Continued on page 92)

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Profitless prosperity? Nonsense! Simple arithmetic is deceptive in this case. The industry-wide loss in income resulting from these price cuts will be closer to $10-12 million. U. S. producers sell only 20% of their metal as ingot, and much of this—exports, for example—has sold at under the new rate. So the price cut won't affect income on this metal. Same applies, to a lesser extent, to mill products.

Despite the price cut, producers' earnings this year will still total about $130 million. With a 10 to 15% sales gain in 1962, plus continued firming of fabricated product prices, producers' earnings can easily hit $160 million. And if demand for consumer durables rises 10%, the industry could sell 2.8 million tons of aluminum in '62, pushing earnings to $180 million.

And the price reductions should not only spur demand for aluminum in traditional markets, but also open the door for the metal in some newer ones. Consider cans. Reports from reliable sources say that a complete plant is being set up in St. Louis. to produce aluminum beer cans for Anheuser-Busch, the world's biggest brewer. The process will be integrated from ingot to completed can. Other major breweries will find it hard to resist the resulting trend to aluminum cans, especially now that the metal cost is 2 cents lower.

At least two other breweries are reportedly ready to order aluminum can making equipment. If this "do-it-yourself" can making idea catches on in the beer business the resulting demand could add up to 10,000 tons of aluminum per month. Additional demand of this magnitude is what the producers need to boost earnings. Reason: When potlines run at above 90% of capacity the profit on that additional metal can be as high as 10 to 11 cents a pound (compared with 7 or 8 cents on metal made at under 90%). So if the industry can pick up a few new tonnage users such as big breweries their profit problems can vanish along with commodity prices.

So aluminum has moved another step in the direction of the high volume, low-unit-cost materials. Aluminium Limited gave it the initial push, but the extent to which Limited will reap positive gains is open to some doubt.

Alcan's sales to the U. S. have dropped sharply in the past two years – from about 213,000 tons in 1958, to around 100,000 tons last year. Cancellation of the big supply contracts with Alcoa and Kaiser account for much of the decline, but it is also true that Alcan's penetration of other U.S. markets has been disappointing. This explains, in part, why the Canadian company joined forces with Scovill, Fairmont Aluminum and Bridgeport Brass in Alroll, the hot rolling mill project now being built in Oswego, N.Y.

But two of the partners – Fairmont, through its par company, Cerro Corp., and Bridgeport, throu its affiliation with National Distillers– have b talking about becoming primary producers. these plans materialize, they could jeopard Limited's role in the reroll venture.

Protection of this project may have been one motive the price cut on ingot. It could also warn ot prospective producers, both here and abroad, t the big Canadian producer means business wh its says that further expansion of primary alu num capacity should be delayed until there' closer balance between consumption and capaci

As for the price cut itself even some producers ad it was long overdue. Perhaps it should have h pened a year ago to set up users for the 1961 upswing.

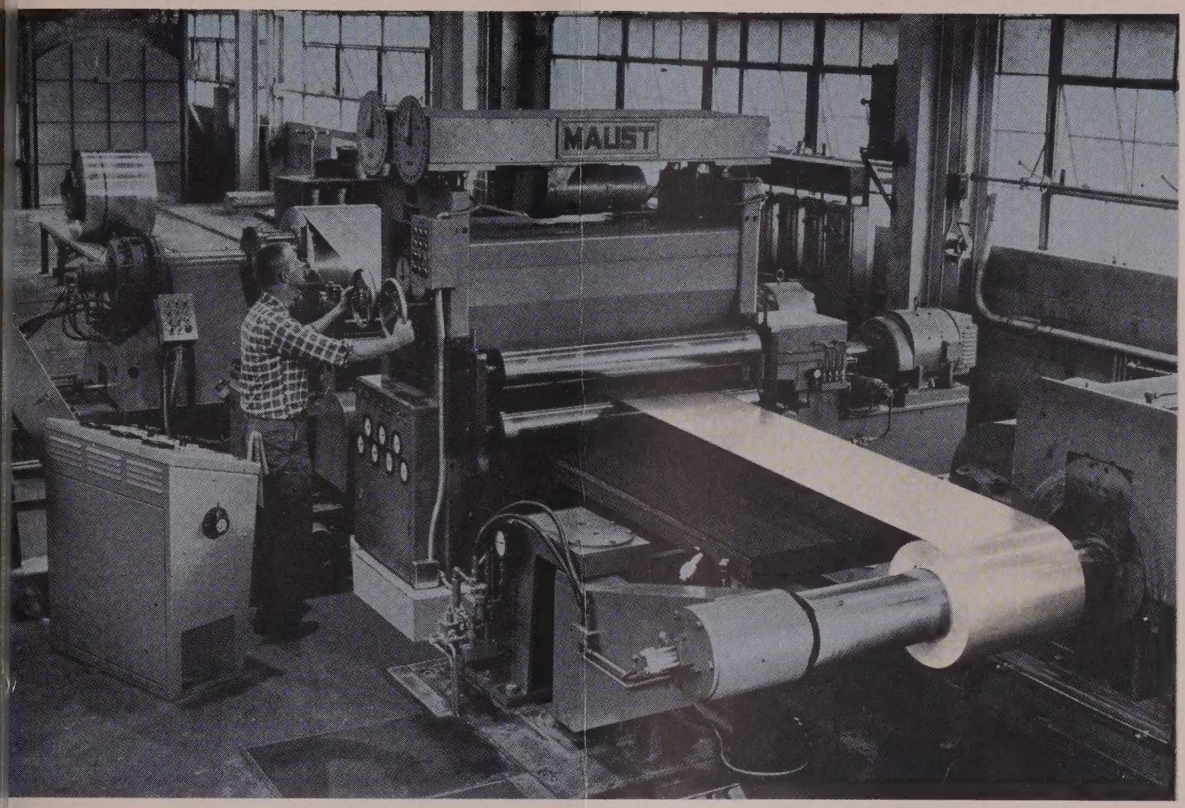
Fabricators have been holding prices. In fact, so prices have strengthened in the past two wee Sheet producers appear more determined th in a long time to keep edging prices back up the published levels. Casting plants, whose b ness has been less than sensational in rec years, are enjoying a pickup and are curren getting higher prices for their castings. Wh backlogs are still low, buyers are in a hurry delivery of both rolled and cast products. Lo like this can carry on well into next year.

Many extruders, believe it or not, are now hold prices, trying to take advantage of the price Several extrusion-fabricators we recently visi have a healthy backlog; foresee good busin in 1962. These extruders, however, are far ah of the pack. They not only perform additio fabrication for their customers, but also earne promote the services they offer. The big dif ence is that they make a profit while the skelet type of shop is starving.

This price cut has awakened many an equipment m ufacturer to the fact that there's new life in aluminum industry. One outfit made four s of casting equipment within a week after price cut. Another sees big sales for slitters, formers and coating lines next year. An ex sion press manufacturer sold three units recer There's gossip that 100 die casting machines be sold in '62. About a half dozen rolling m jobs are out for bids.

"If aluminum gets any cheaper," said one user, "al our damned competitors that use other me will be getting into the act." So, for whatever sons the cut was made, it could well be a bles in disguise. If, as a result of it, the producers peddle all the metal their potlines can prod the whole industry will be in for a busy – even a profitable – year in 1962.

—The Ed



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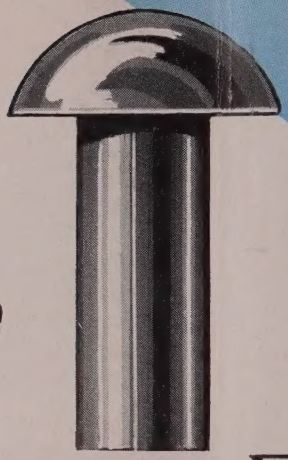

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